TECHNOLOGY DEPT.

the OIL AND GAS JOURNAL

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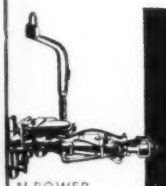
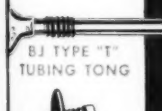
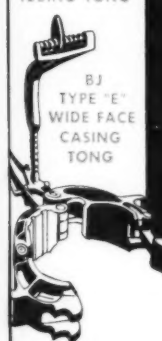
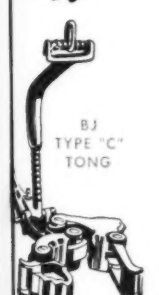

BJ POWER
INATION TONG

BJ
TYPE "B"
TONG


BJ TYPE "T"
TUBING TONG


BJ
TYPE "E"
WIDE FACE
CASING
TONG

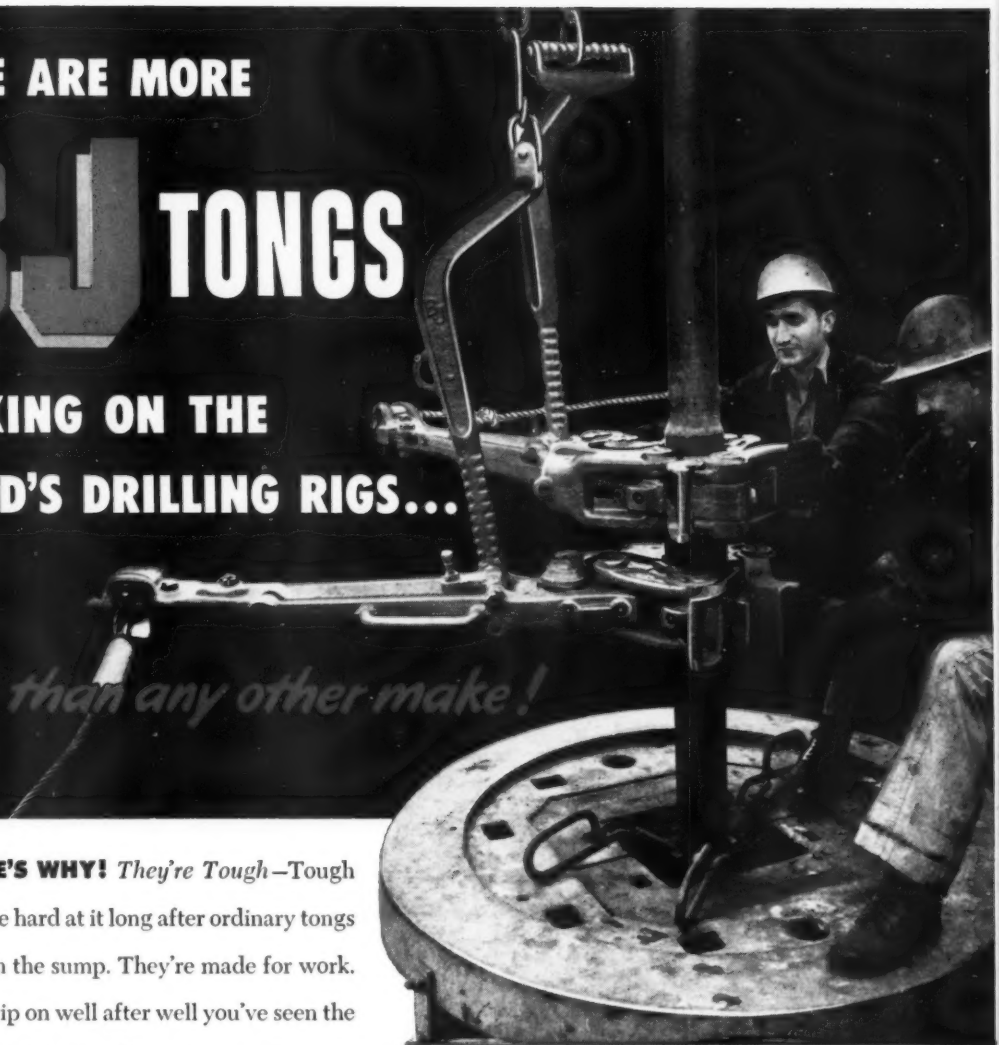

BJ
TYPE "C"
TONG

TYPE "WS"
WIDE FACE TUBING TONG

THERE ARE MORE

BJ TONGS

WORKING ON THE
WORLD'S DRILLING RIGS...



more than any other make!

AND HERE'S WHY! *They're Tough*—Tough BJ Tongs are hard at it long after ordinary tongs are tossed in the sump. They're made for work. Trip after trip on well after well you've seen the same dependable sets of BJs go to work.

That's the kind of time and money saving performance oil men want in the tools they use. *And that's why more oil men specify and buy BJ!*

BJ MEANS ENGINEERED OIL TOOLS

Byron Jackson Co.

Since 1872

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STOCKING JOBBERS ALL PRINCIPAL OIL FIELDS

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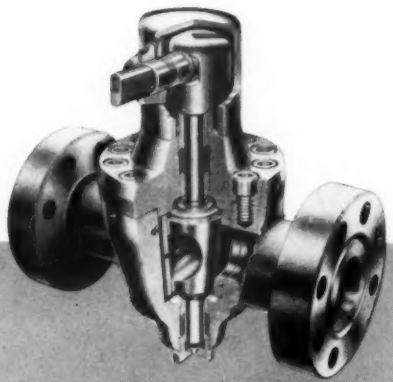
HIGHEST QUALITY

ALL Cameron®

ALL FORGED STEEL CHRISTMAS TREES

cost no more than ordinary trees



FEATURING THE Cameron® NON-LUBRICATED LIFT-PLUG VALVE

NON-LUBRICATED—no grease required to effect seal; reduces chance for human error and need for maintenance.

PRESSURE SEALING—when plug is seated, line pressure automatically forces seat into tighter engagement with plug.

UNIQUE LIFT-PLUG ACTUATOR—turns and reseats plug in continuous turn of a lever.

RENEWABLE SEAT AND PLUG—easily replaced; permits any desired trim.

FIELD REPAIR—completely overhauled without removal from line.

EASY OPERATION—requires less operating effort than other valve designs.

Cameron Christmas trees, always a good buy, are now truly the outstanding value in the field. From top to bottom, every component part of today's Cameron tree is forged from selected alloy steel in the ultra-modern Cameron forge shop. Never before has any manufacturer offered the industry a completely forged steel Christmas tree manifold, with the superior metallurgical features that only forged steel provides. Never before has Cameron offered the industry a Christmas tree assembled entirely of Cameron products . . . an accomplishment made possible by the new Cameron Non-Lubricated "LP" Valve.

CAMERON IRON WORKS, INC.
P. O. BOX 1212 HOUSTON, TEXAS
Export: 74 Trinity Place, New York, N. Y.

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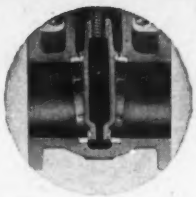
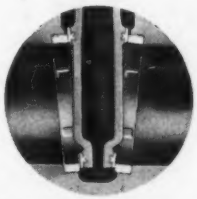
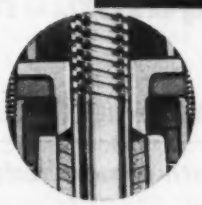


Straight-Flow Port Design reduces fluid turbulence to a practical minimum.



Seat Rings of end-seated type are screwed into the body.

Sure-Grip Malleable Handwheel for non-skid gripping even with heavy gloves.



Brass Liner on Glands assures greater resistance to corrosion and scoring.

WALWORTH

iron body gate valves

with screwed or flanged ends

... 8 Outstanding Features

For complete information on these new Walworth Iron Body Valves, see your local Walworth distributor, or write for bulletin 106.

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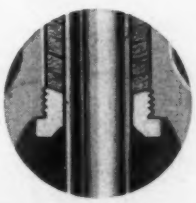
valves and fittings

60 EAST 42nd STREET NEW YORK 17, N. Y.

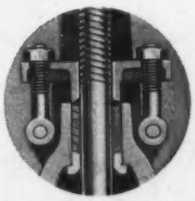
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

T-head Disc-to-Stem connection on OS&Y types provides stronger connection, prevents loosening of disc by corrosion.



Bronze Back-Seat Bushings in bonnets of OS&Y valves.

Solid Web Type Disc in OS&Y valves for greater strength and longer service.



Hinged Gland Eye-Bolts on OS&Y valves permit faster, easier repacking under full pressure.

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1950.

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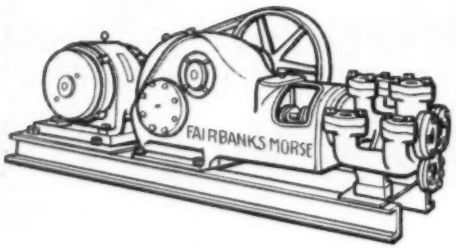
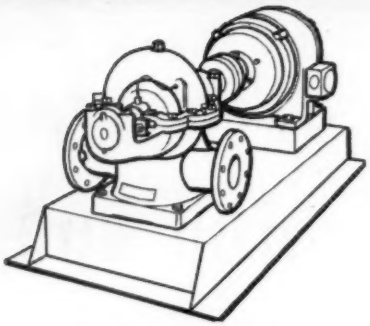
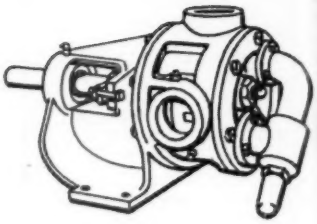


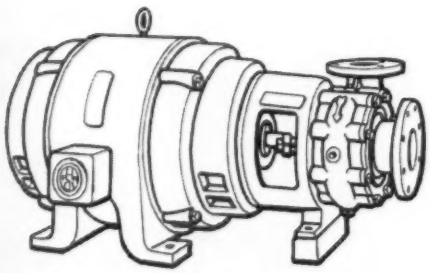
Power Pumps



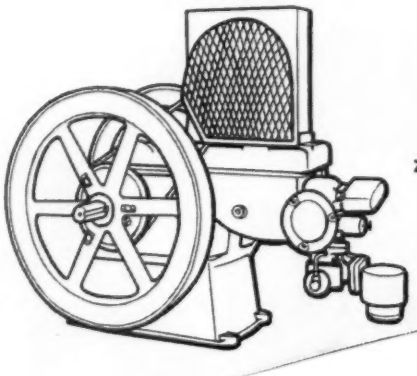
Centrifugal Pumps



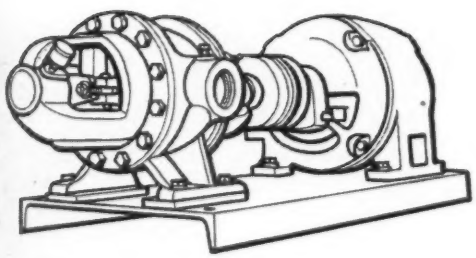
Rotary Pumps



Builtogether Pumps

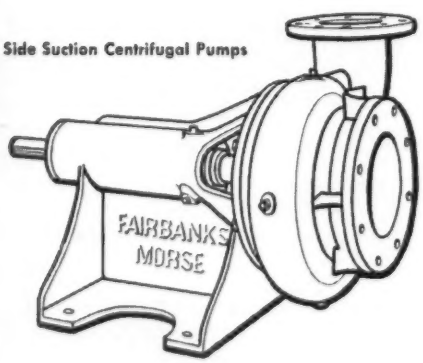


ZC Engines



Westco Pumps

Side Suction Centrifugal Pumps



Electric Motors

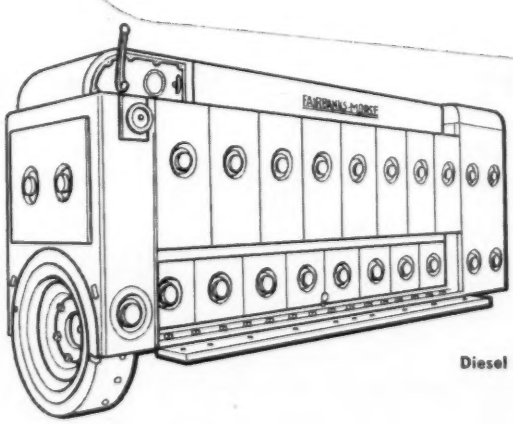
Designed for Dependability

Fairbanks-Morse Oil Field Equipment

FAIRBANKS-MORSE

A name worth remembering

OIL FIELD EQUIPMENT • DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES • MOTORS • GENERATORS • STOKERS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS



Diesel Engines

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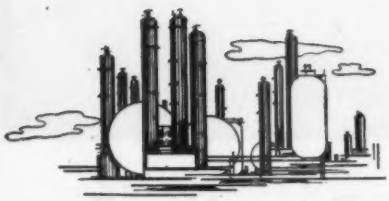
It's at its best when the going is TOUGH



For the high-temperature, high-pressure bolting applications encountered in refineries, it pays to put the Bethlehem Quenched Nut to work. For this economical nut can take it. In fact, it's at its best when the going is tough.

The Bethlehem Quenched Nut has the ability to withstand difficult bolting conditions because it is hot forged. Instead of being punched from a hot bar, like ordinary nuts, the Quenched Nut is formed by forging and extruding hot metal into a forming die. This is followed by quenching and tempering. What's the result? A nut strong enough to break virtually any stud or bolt on which it is used.

The Bethlehem Quenched Nut also has a tough grain structure. Besides, its oxidized sides put up a good fight against atmospheric corrosion, and its ground bearing surface is definitely superior to common, machined surfaces.

The Quenched Nut is made at Bethlehem's Lebanon, Pa., plant. It conforms to Grade 2H of ASTM Specification A194, and is carried in stock in bolt sizes from 3/8 in. to 3 1/2 in. Also carried in stock at Lebanon are nuts in Grades 0, 1, 2, and 4. For additional details about the Quenched Nut, call in a Bethlehem man, or write to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation.

BETHLEHEM STEEL

Bethlehem supplies every type of Fastener

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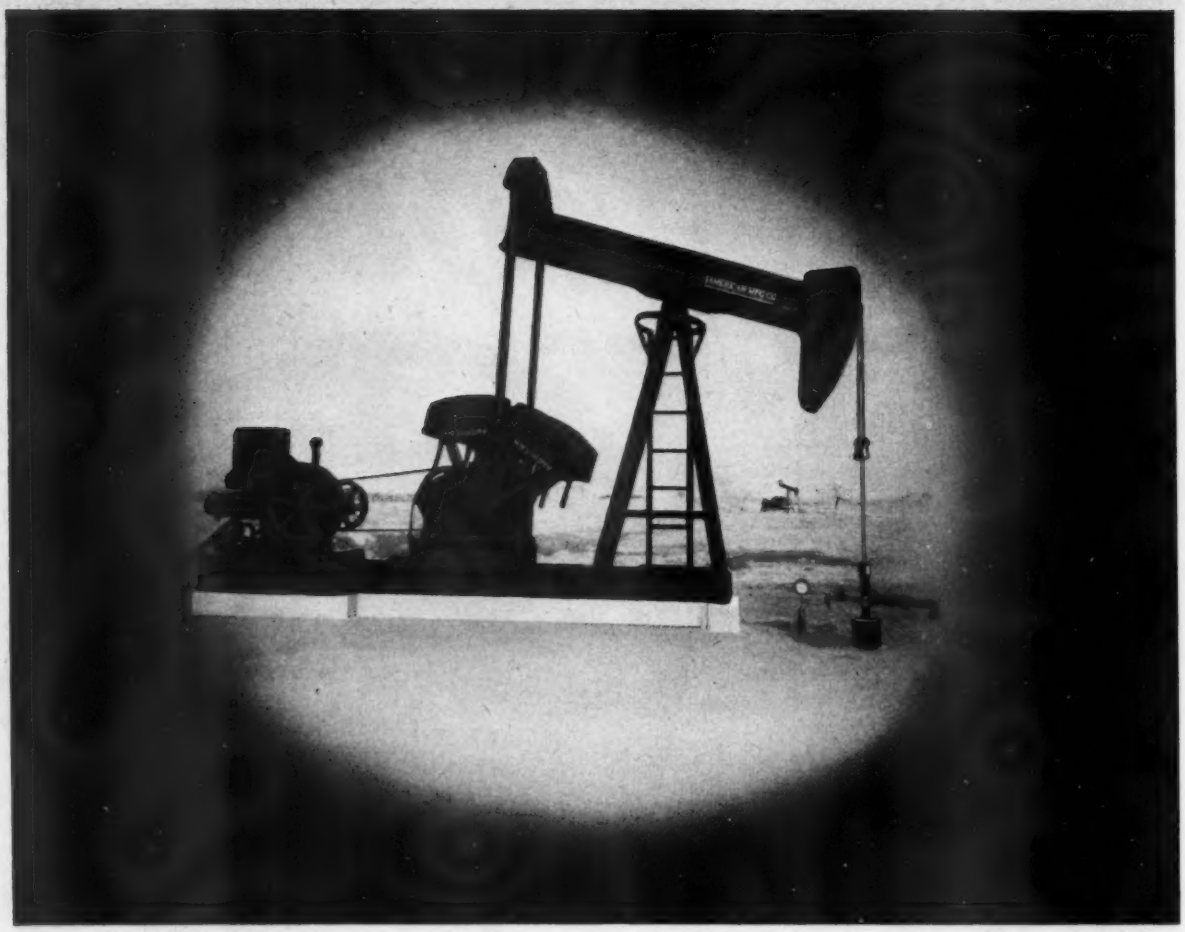

American Pumping Units = Low Pumping Costs

Contact your favorite supply store or the nearest American office NOW.

Lower pumping costs for the operator in the field is the result of 26 years of working to improve American equipment. The 1950 AMERICANS are designed to A. P. I. Specifications throughout, and engineered for longer service with less servicing, and maximum production with a minimum of power consumption. Today there are thousands of American Pumping Units in the fields pumping profitably . . . some that have been on the job continuously for 15 years.

When you have wells ready to go on the pump, or when you replace inefficient pumping equipment, it will pay you to check on the cost-cutting advantages of the new AMERICAN Pumping Units.

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26th Year

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. . . gives Kidde Dry Chemical Extinguisher a 44% margin of safety!

The Factory Mutual Laboratories require that a 20 pound dry chemical extinguisher effectively cover 25 square feet of burning area . . . but the *Kidde* 20 pounder blanketed 36 square feet . . . *gave 44% extra coverage, extra safety!*

Yes, *Kidde* Dry Chemical Extinguishers are quick and sure for fires in flammable liquids, live electrical equipment and for textiles. *Kidde* Trigger-Finger Control lets you just pick up extinguisher, point the horn and pull the trigger. *Kidde* streamlined diffuser horn gives you improved, cloud-like discharge pattern, greater coverage, and a heat-insulating blanket to guard the operator. The dry chemical absorbs heat, smothers flames, reaches corners, cracks, crevices. When these *Kidde* units go on, flames go out.

Kidde Dry Chemical Extinguishers in 20 and 30 pound units, are built to last, easy to use, simple to recharge . . . and give you a big margin of safety. Use the right kind of extinguisher for the right kind of fire—use *Kidde*.

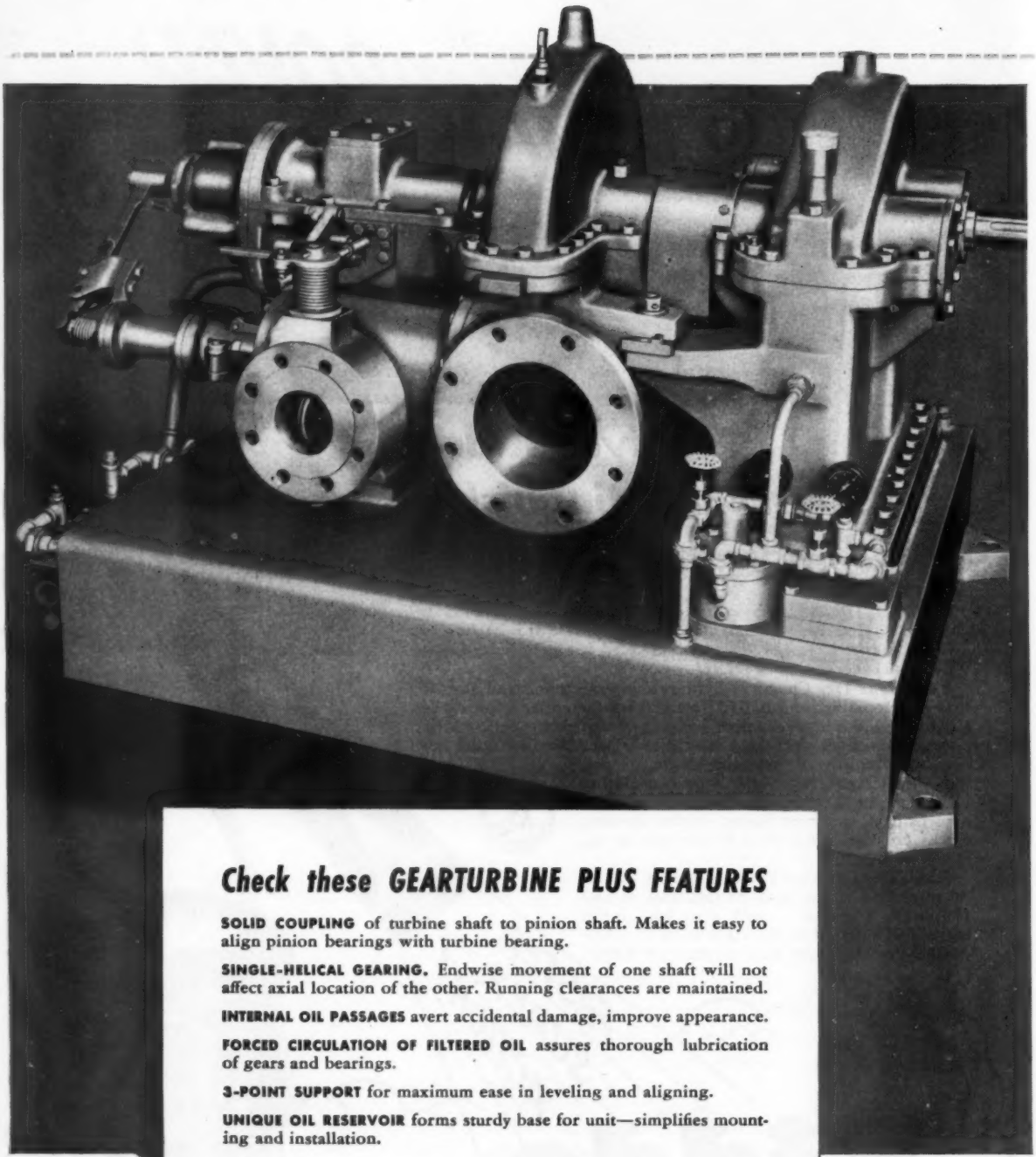
FASTER SURER ACTION!

Kidde

Walter Kidde & Company, 754 **Main St., Belleville 9, N. J.**

In Canada: Walter Kidde & Company, Ltd., Montreal, P. Q.

YOU CAN BE **SURE**.. IF IT'S
Westinghouse



Check these GEARTURBINE PLUS FEATURES

SOLID COUPLING of turbine shaft to pinion shaft. Makes it easy to align pinion bearings with turbine bearing.

SINGLE-HELICAL GEARING. Endwise movement of one shaft will not affect axial location of the other. Running clearances are maintained.

INTERNAL OIL PASSAGES avert accidental damage, improve appearance.

FORCED CIRCULATION OF FILTERED OIL assures thorough lubrication of gears and bearings.

3-POINT SUPPORT for maximum ease in leveling and aligning.

UNIQUE OIL RESERVOIR forms sturdy base for unit—simplifies mounting and installation.

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NEW GEARTURBINE

cuts initial costs

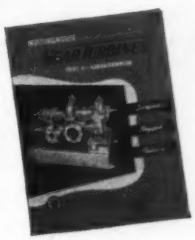
These "standardized" drives cost less to buy, less to install and operate. They wrap up—in a single, compact "package"—a rugged speed-reduction unit solidly coupled to a Type E turbine. Initial cost is substantially less than turbines with separate speed reducers.

It's a winning combination that brings the efficiency of high-speed, single-stage turbines to slower speed equipment such as fans, pumps, compressors and generators . . . at substantial savings.

Standardization results in savings in manufacturing costs, avoids costly specials, saves space, assures perfect factory alignment of turbine and reduction gearing. Yet, you get maximum flexibility. Any combination of three turbine wheel sizes, three gears and three types of governor can be used, according to your needs. Many turbine parts are interchangeable between wheel sizes. Liberal use of corrosion-resistant materials insures long, trouble-free operation. Maintenance is almost negligible.

Westinghouse Gearturbines are especially applicable for ratings up to 500 hp and output speeds commonly found in single-ended applications.

For your steam drives that require speed reduction, get these cost-saving benefits. Call your nearby Westinghouse representative for data and application help, or write for Booklet B-4346. Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa. J-50307

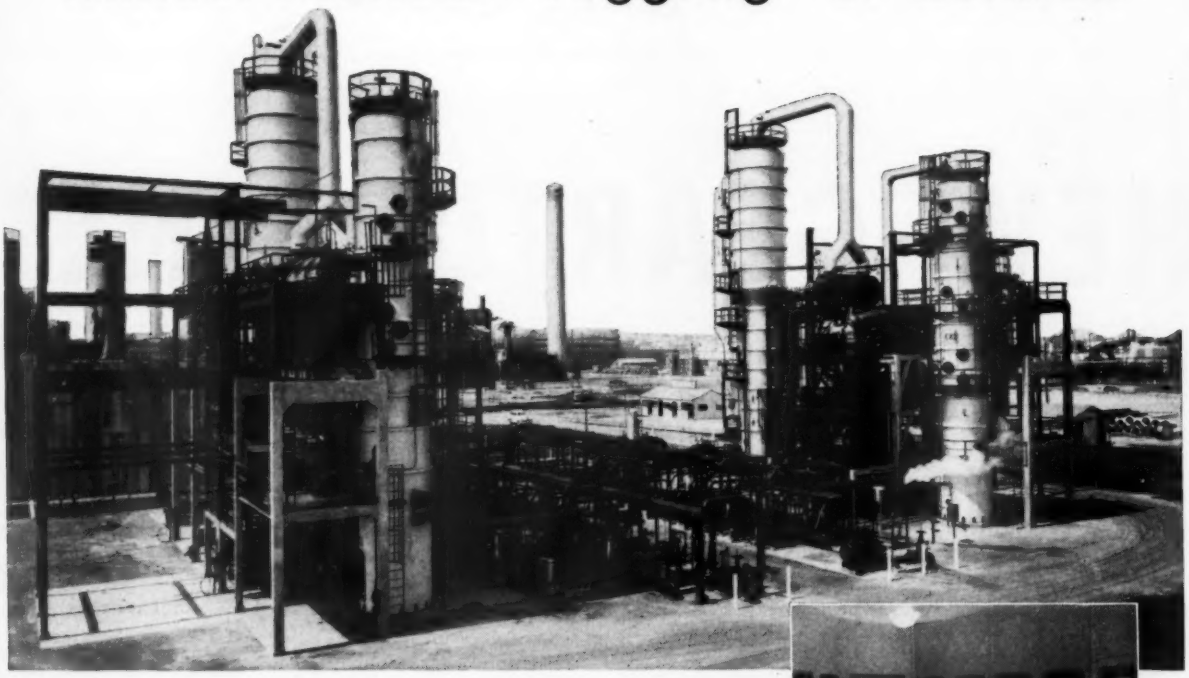


SEE THE NEW TYPE E TURBINE MOVIE

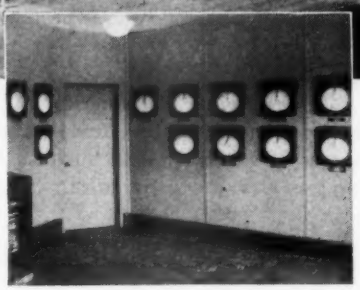
Ask your Westinghouse representative for a showing *in your office.* Takes only 10 minutes.

Westinghouse
TYPE E
Gearturbines

On Stream *Automatically* without Manual "Juggling" of Control!



Twin naphtha rerun stills at El Segundo Refinery of Standard Oil Company of California, built by C. F. Braun, Co.



One corner of the control room, showing a few of the M-40 Controllers which automatically operate the process.

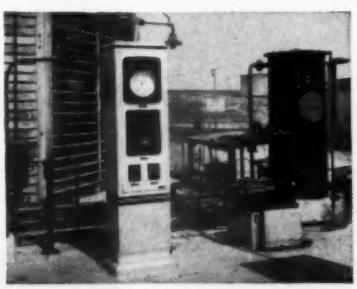
. . . *thanks to Foxboro M-40 Controllers*

At the El Segundo Refinery of the Standard Oil Company of California, fast, sure start-ups typify the operation afforded by M-40 Controllers on two new naphtha rerun stills.

Because each pre-set value is so accurately met by the M-40 Controllers, every process temperature, pressure and flow rate comes directly to its control point without any manual "babying". And the inherent stability of M-40 control action *holds* it there, for maximum process-uniformity.

The Foxboro M-40 Controller gives you the benefit of the most advanced developments in the field of pneumatic instrument design. Its rigid unit construction and almost frictionless moving parts result in greater power, accuracy, and sensitivity. Available for temperature, pressure, flow, level and other applications.

Write for details. **The Foxboro Company, 60 Neponset Ave., Foxboro, Mass., U. S. A.**



pH controller for cooling tower. It holds pH of process cooling water within desired limits.

FOXBORO *Reg. U.S. Pat. Off.* **CONTROLLERS**

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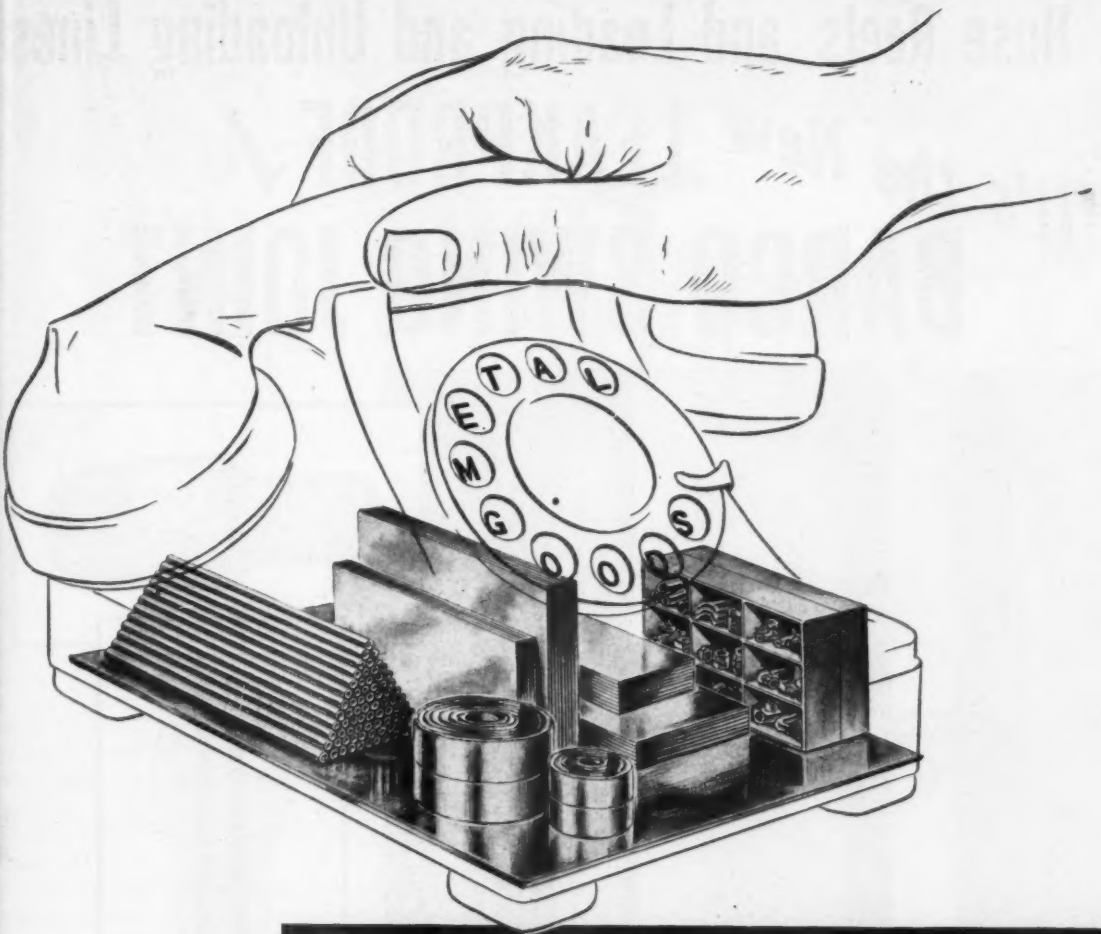

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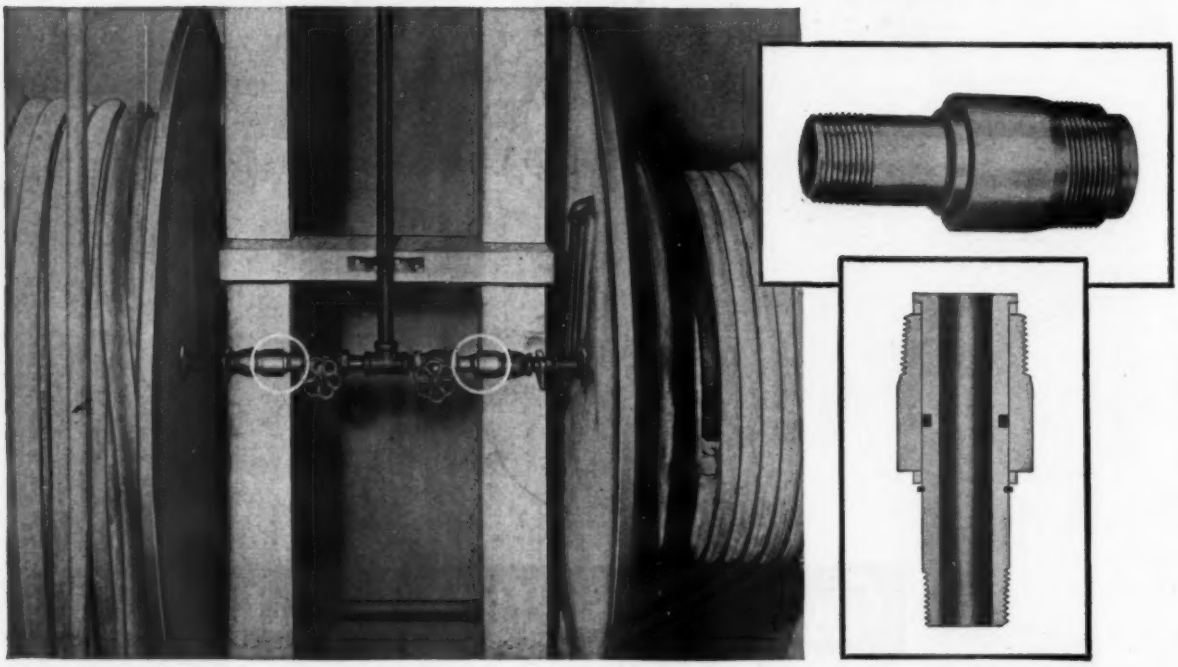
For Hose Reels, and Loading and Unloading Lines

It's the New LEAKPROOF ✓ BARCO SWING JOINT



LOW COST • COMPACT DESIGN

Barco adds to its famous line of joints this remarkable new Swing Joint, the result of careful planning and design. The construction is extremely simple, with a long bearing surface and no side flexibility. Also suitable for constant, slow rotation and pressures up to 1000 lbs. with temperatures from −50° to +165°. Supports piping arrangements easily. Write for more information to Barco Manufacturing Company, 1839H Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal. Our engineers are ready to help you.

The New BARCO SWING JOINT

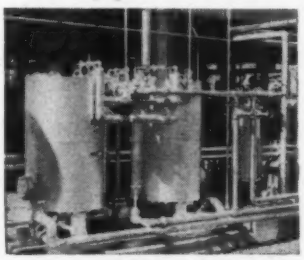
BARCO—The Only Truly Complete Line of Flexible Swivel and Revolving Joints

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

IF the compressed air in your instrument lines and process-control lines holds moisture, rust or oil, you're in trouble. Instrument readings can go haywire . . . air-line valves can stick . . . controls can go entirely "off the beam" . . . the whole shootin' match can literally blow up!

Isn't it silly to install an elaborate remote process control system and then not keep the pressure air *clean* and DRY! *Dry air can't freeze* . . . can't form rust.

It is so easy to keep the air dry, clean and oil-free with ALCOA Activated Alumina. This reliable desiccant effectively prevents moisture and oil from entering the system.



Courtesy of
Stanolind Oil & Gas Company

The photograph illustrates a typical unit used for maintaining process-control-line air in proper condition. Air is dried by being passed through beds of ALCOA Activated Alumina, alternately, in the two towers at the left. At the right is an oil filter—also charged with ALCOA Activated Alumina—which cleans the air of oil and suspended impurities that may enter system from the compressors.

This thorough conditioning of the air helps insure the efficiency of process-control systems . . . reduces maintenance and operating hazards. (This type of equipment also is used for industrial compressed air and paint-spray systems.)

DON'T FORGET the convenience and economy of ALCOA Aluminum instrument air-line tubing in long lengths.

Let us send you the booklet:
"ACTIVATED ALUMINA—Its Properties and Uses"

This 5⅜" x 8¼", 48-page illustrated booklet gives the properties of ALCOA Activated Alumina and describes many of its applications. Write to: ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 618G Gulf Building, Pittsburgh 19, Pennsylvania.

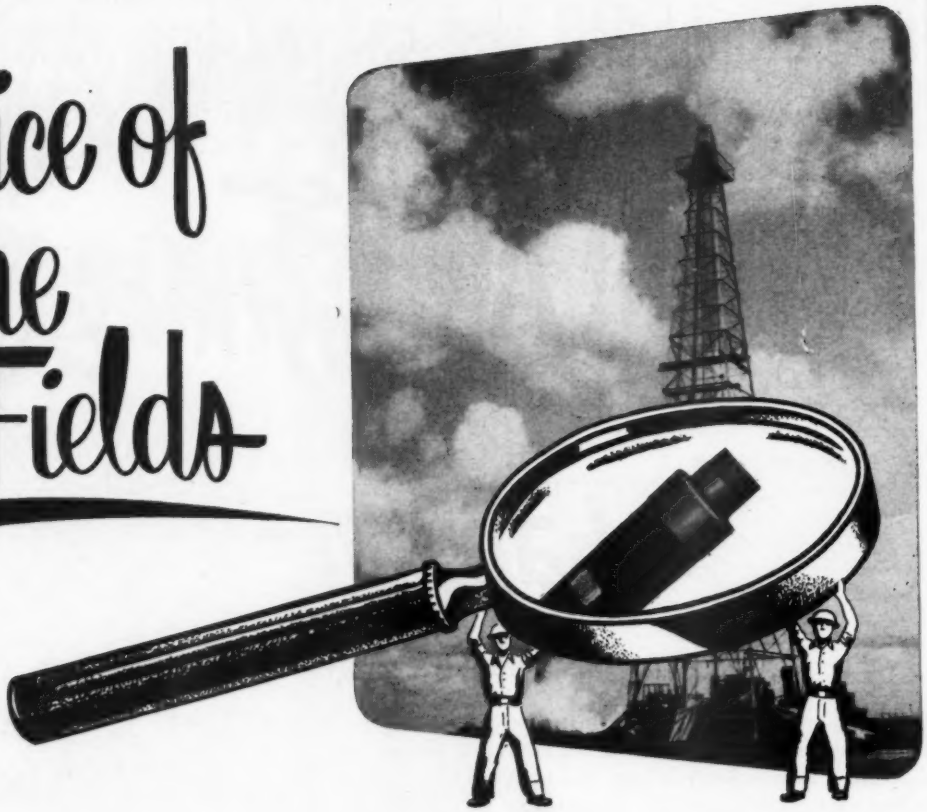
Alcoa Chemicals

ALCOA ALUMINUM

ALUMINAS and FLUORIDES

ACTIVATED ALUMINAS • CALCINED ALUMINAS • HYDRATED ALUMINAS • TABULAR ALUMINAS • LOW SODA ALUMINAS
ALUMINUM FLUORIDE • SODIUM FLUORIDE • SODIUM ACID FLUORIDE • FLUOBORIC ACID • CRYOLITE • GALLIUM

Choice of the Oil Fields



REPUBLIC'S CHAMPION ROTARY DRILLING HOSE WITH PATENTED BOLTLESS COUPLING

● The decision goes to Champion . . . longest wearing rotary drilling hose made!

It's built tough as nails with flexible steel muscles conditioned to stand severe shock and higher pulsating pressures. It's more flexible . . . hangs better in the derrick. It's thickly coated inside and out with special-formula Reprene, making it practically immune to abrasion or deterioration from oil contact.

Streamlined, patented Boltless Couplings, imbedded in the hose carcass, eliminate all bolts, flanges or other protrusions.

A special hydraulic gasket tightens the seal as the pressure increases.

For more than 49 years, Republic has been *the* specialist in the industrial rubber goods field. Consult your Distributor today or write direct for specific information on your requirements.

Champion Rotary Drilling Hose is available in standard lengths up to 55'. Type C Hose withstands pressures up to 5000 psi., Type B up to 4000 psi., and Type A up to 3000 psi.

Pioneers in the use of COLD RUBBER

REPUBLIC RUBBER DIVISION
LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN, OHIO
Lee of Conshohocken Tires • • Conshohocken, Pa.

INDUSTRIAL RUBBER PRODUCTS BY
REPUBLIC RUBBER DIVISION

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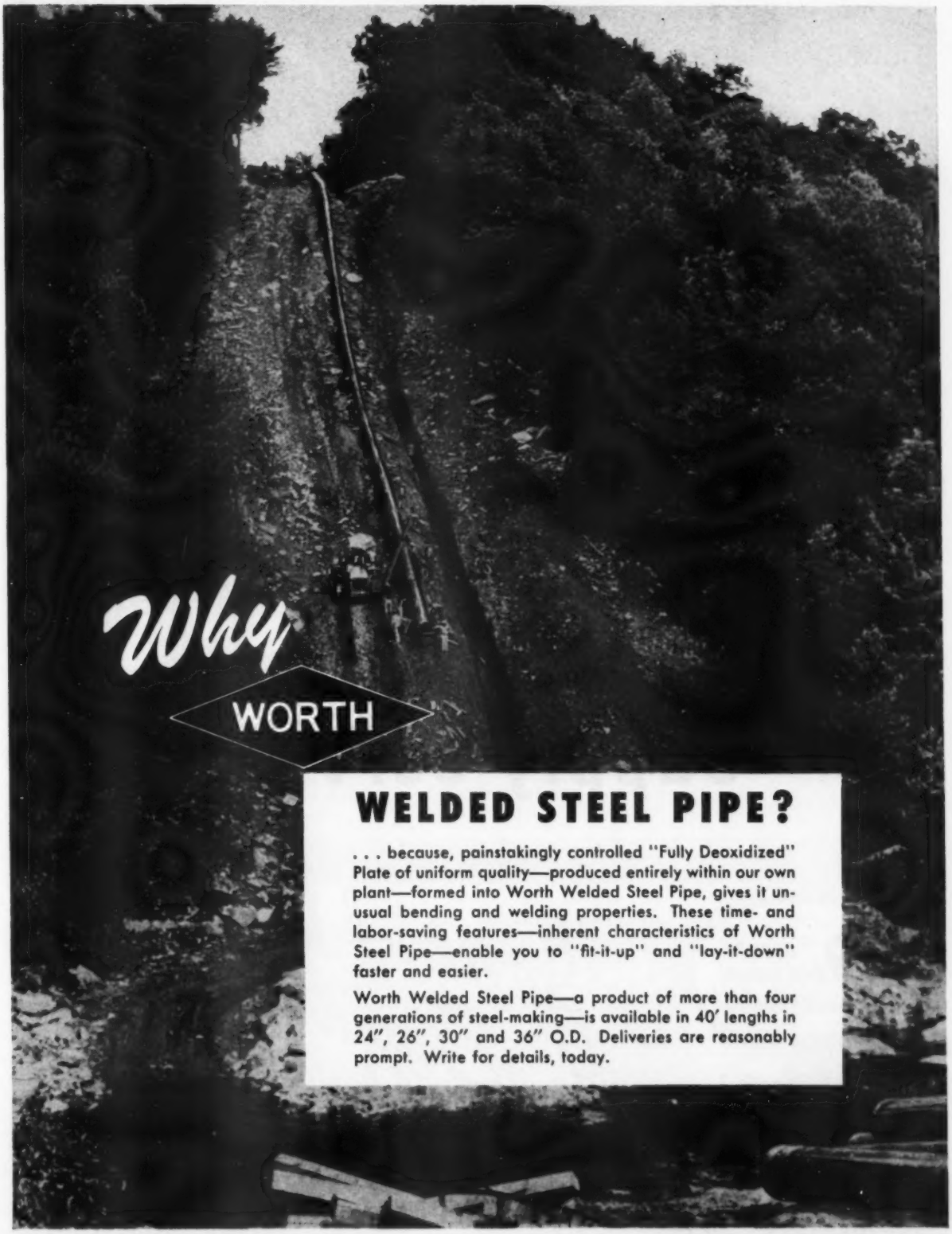

WELDED STEEL PIPE?

. . . because, painstakingly controlled "Fully Deoxidized" Plate of uniform quality—produced entirely within our own plant—formed into Worth Welded Steel Pipe, gives it unusual bending and welding properties. These time- and labor-saving features—inherent characteristics of Worth Steel Pipe—enable you to "fit-it-up" and "lay-it-down" faster and easier.

Worth Welded Steel Pipe—a product of more than four generations of steel-making—is available in 40' lengths in 24", 26", 30" and 36" O.D. Deliveries are reasonably prompt. Write for details, today.

FLANGED AND DISHED HEADS • CARBON AND STAINLESS-CLAD STEEL PLATES

WORTH STEEL COMPANY • Claymont, Delaware

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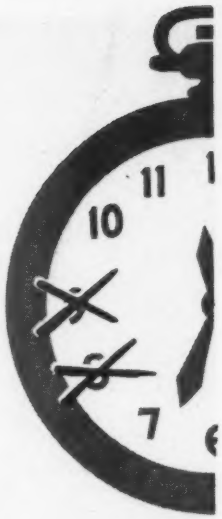
Save Steps

Save Time



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Supply Service

"... here's MY warehouse!"

Jones & Laughlin Supply Company

Subsidiary of
Jones & Laughlin
Steel Corporation

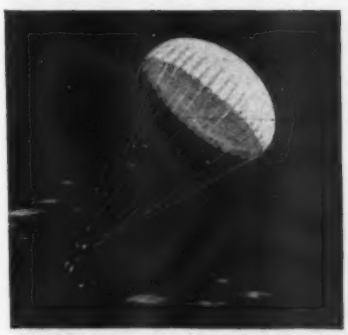
J&L STEEL

TULSA, OKLAHOMA

EXPORT: 405 LEXINGTON AVE., NEW YORK, N.Y. U.S.A.

Shooting the Chute AT 600 M.P.H.

1. Streaking across the sky at near-supersonic speed, the jet fighter bursts into flames. "Bailing out" in the ordinary way is impossible because of extreme air pressures. But, thanks to the newest U. S. Navy safety development, the pilot of a modern jet simply trips a trigger in the cockpit . . . and two exploding cartridges shoot him, seat, parachute and all, out of the blazing airplane to safety.



2. **The exploding escape seat** is an amazing example of a scientific device designed to do the "impossible" . . . just as the amazing new Conoco Super Motor Oil has been scientifically "engineered" to *fight* wear in the engine of your car. New Conoco Super OIL-PLATES your engine . . . makes it last longer.

3. **50,000 Miles—No Wear!** After a rugged 50,000-mile road test, engines lubricated with new Conoco Super Motor Oil showed *no wear of any consequence*... an average of less than one one-thousandth inch on cylinders and crankshafts! Also proved: with proper crankcase drains and regular care—Conoco Super can give you amazing economy. Average gasoline mileage for the last 5,000 miles was actually 99.77% as good as for the first 5,000.

CONTINENTAL OIL COMPANY, pioneer in oil-perfecting additives, and for over 25 years a leader in oil research, has more than 100 patents on discoveries that improve performance and lengthen the life of your car.

CONTINENTAL OIL COMPANY

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Worried about HCl corrosion?

Let MONEL help you keep costs down

Monel-lined top section of a large fractionating column. Made by the A. O. Smith Corporation for one of the nation's largest oil refiners.

Many years of service experience backed by extensive research, have shown that Monel® has satisfactory resistance to destructive corrosion by hydrogen chloride and hydrochloric acid.

In applications where low concentrations of hydrochloric acid must be handled regularly, Monel vessels and processing equipment have given outstanding service. In petroleum refining, for example, Monel-lined fractionating columns, tanks, and Monel piping and fittings have substantially outlasted other metals.

In addition, Monel is an excellent structural material, possessing high strength, and good workability. Monel can be welded to form corrosion-resistant joints; can be machined, formed, and bent with ordinary shop tools and methods.

Monel is available in all standard mill forms, including seamless tubing and Monel-Clad Steel sheet and plates.

If you have corrosion problems and are looking for ways to preserve product purity or cut maintenance expense, you are invited to consult our Corrosion Engineering Service. Write, explaining your difficulties, and we will put at your disposal a vast accumulation of research and experience data.

Monel-lined tanks installed at the plant of a large Southern oil refiner. Tanks are lined with Monel to combat corrosive action of dilute hydrochloric acid.

The tanks were fabricated by Wyatt Metal & Boiler Works, Houston, Texas.

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NICKEL INCO TRADE MARK ALLOYS

MONEL® • "K"® MONEL • "R"® MONEL • "KR"® MONEL • NICKEL • "D"® NICKEL • "L"® NICKEL INCONEL® • DURANICKEL® • PERMANICKEL® INCONEL "X"®.

THE INTERNATIONAL NICKEL COMPANY, INC.

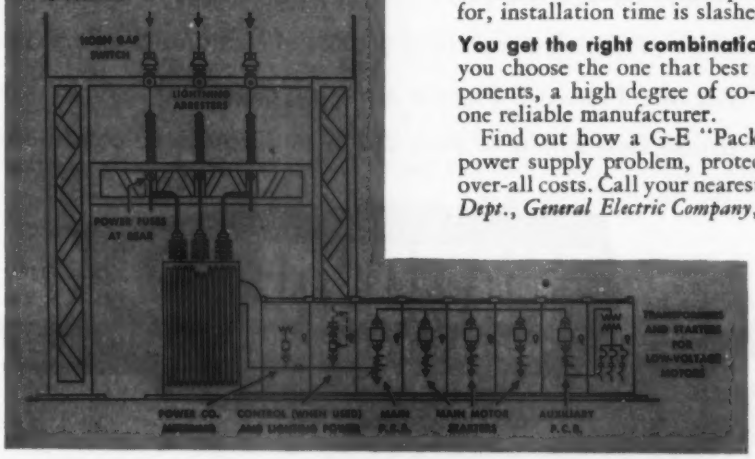
67 Wall Street, New York 5, N. Y.

XUM

Pipeline power distribution—
ALL YOU NEED IN ONE COST-SAVING PACKAGE!

Typical of the neat appearance and compact arrangement of G-E "Package" substations is this Texas pipeline-station installation. This one unit makes available 115-230-, 480-, and 2400-volt power covering all motor and lighting requirements.

What's in the "Package?" It comprises a complete outdoor steel switching structure—plus a master unit substation. The switching structure may include lightning arresters, disconnecting switches, buses and bus supports, potential transformers and current transformers, relaying and metering equipment, and outdoor oil circuit breakers (or fuses). The unit substation includes transformers and in the switchgear section, motor starters. Ratings are from 750 to 45,000 kva, at incoming voltages from 11 to 69 kv and outgoing voltages up to 13.8 kv.



This one cost-saver—a General Electric "Package" substation—combines *all* the electric equipment your pipeline station needs between incoming utility lines and all motor and lighting circuits. Ordered, designed, and built as a single unit, it comes complete, co-ordinated, ready-to-install.

You reduce system cost Because you don't have to order the components piecemeal, you save engineering cost, as well as time and trouble. And because the entire unit arrives in large, factory-built sections, installation expense is less.

You save time Less drafting and manufacturing time is needed because the over-all design is already largely complete, and the components are in stock or can be built repetitively. With no bottleneck parts to wait for, installation time is slashed.

You get the right combination From scores of standard combinations, you choose the one that best fits your needs. You get the finest of components, a high degree of co-ordination, and responsibility centered on one reliable manufacturer.

Find out how a G-E "Package" substation can solve your pipeline's power supply problem, protect your continuity of operations, help cut over-all costs. Call your nearest G-E office for more information. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

Power supply for pipeline stations is one of many subjects vividly shown in "Lease on the Future," General Electric's "More Power to America" full-color and sound movie on oil field electrification. Ask your nearest G-E office to arrange a showing for you.

Everything you need to cut oil pipeline costs —electrically!

GENERAL ELECTRIC

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BRAND NAME

means plenty on sucker rods...

It's what's *inside* a sucker rod that counts : : :

And that NSCO shield branded into every National Sucker Rod is your assurance that it's a better rod metallurgically and mechanically, that it will give maximum service at lowest cost under all pumping conditions.

Wherever you are producing, you are close to a complete stock of all three standard grades of National Sucker Rods. Ask the National Supply store or representative for the grade best suited to your crude and your well conditions.

THE NATIONAL SUPPLY COMPANY

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DIVISION OFFICES: CASPER; FT. WORTH; PITTSBURGH; TULSA; TORRANCE.

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NATIONAL OIL FIELD MACHINERY AND EQUIPMENT... SPANG PIPE... SUPERIOR ENGINES

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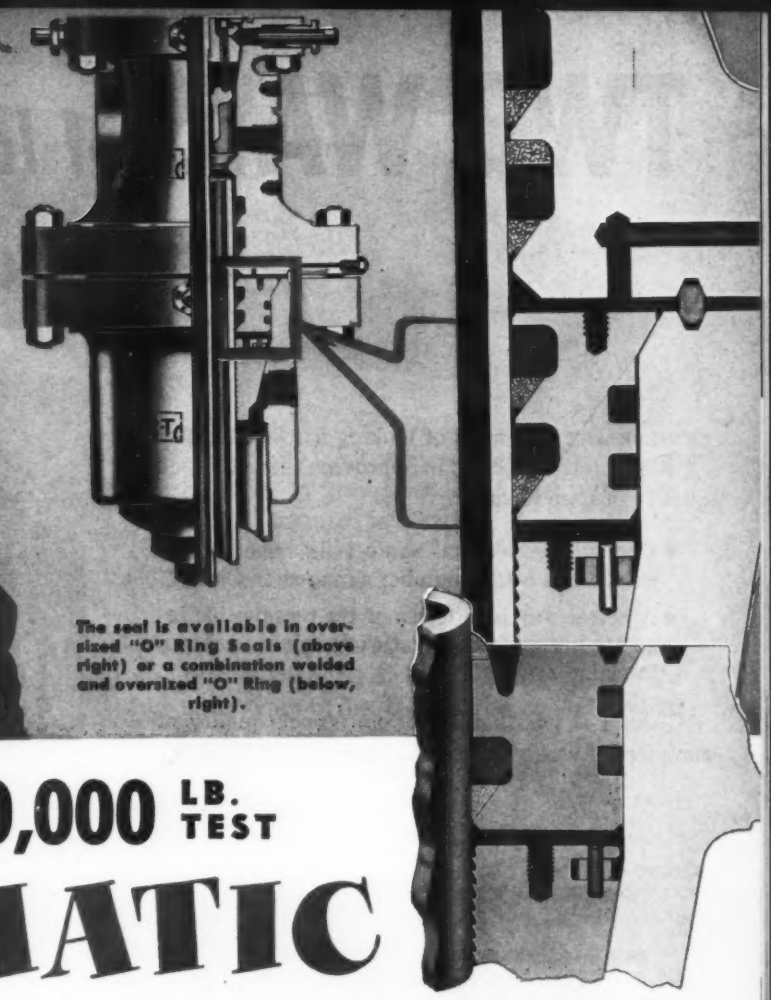
SLIPS AND SEAL ARE SEPARATE



The seal is available in oversized "O" Ring Seals (above right) or a combination welded and oversized "O" Ring (below, right).

IN THIS NEW O-C-T 20,000 LB. TEST

AUTOMATIC FLOATING SEAL

Outstanding among the many features of this new O-C-T "C-18-H" hanger is the design which allows slips and seal to work independently. When a 20,000 lb. test load is applied, for example, the load is applied to the automatic sealing element and not to the slips. This feature removes any possibility of collapsing or crushing pipe with test loads. The test load is applied to the heavy bevel on the body of the head. In addition, Allen screws have been eliminated from the design and well pressure is utilized to equalize the seal all around the pipe. Extra heavy seals are backed up by extrusion rings which conform to the plus or minus API tolerance of the casing. Corrosive gas and fluids are sealed off from the API Metal Ring Gasket between flanges.

Check and compare this new O-C-T "C-18-H" Casing Head with any other head. It provides maximum safety, simplicity and flexibility. Write today for engineering details and prices. O-C-T Products are always dependable and available through more than 700 conveniently located supply stores.

O-C-T PRODUCTS — dependable and available through more than 700 supply store locations.

Oil Center Tool Co.

P. O. Box 3091, Houston, Texas

Export Representatives Venezuela, Colombia, Peru, and Ecuador — Berry & Hall, Apartado No. 304, Maracaibo, Venezuela. Sterling Arcade-in Grand, Sutliff & Gell, Ltd., Southall, Middlesex, England. Address Export Inquiries for All Other Countries to P. O. Box 3091, Houston 1, Texas.

XUM

TWO WAYS of looking at the effectiveness of "LEAD"

THERE ARE two ways of looking at the effectiveness of tetraethyllead in improving the antiknock quality of base fuels:

- **One way—the usual way—is in terms of the increase in octane number as shown in Chart 1.**
- **A better way is in terms of the permissible increase in compression ratio of engines as shown in Chart 2.**

Chart 1 shows that as the antiknock quality of commercial base gasolines has gone up (1936-1949),

ONE WAY

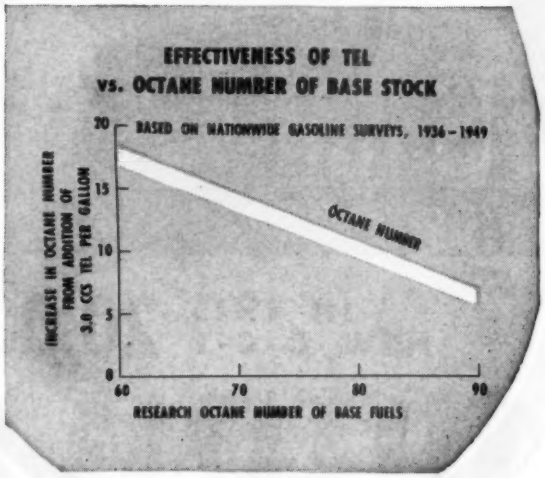


CHART 1

the increase in octane number units due to addition of tetraethyllead has become smaller. This *apparent* falling off in tetraethyllead effectiveness is due to the increased size of octane-number units at the upper end of the scale. (Chart 3)

Chart 2 shows that as the antiknock quality of base fuels has gone up, the increase in compression ratio permitted on an engine of good design by the addition of tetraethyllead has actually become greater. For the refiner seeking the most economical means of meeting the increased compression ratio of automobiles, this is the realistic way of looking at tetraethyllead effectiveness.

An even more striking illustration of the greater effectiveness of tetraethyllead, when added to fuels of higher antiknock quality, is provided by Chart 4. In this case the base fuels are mixtures of normal

CHART 4

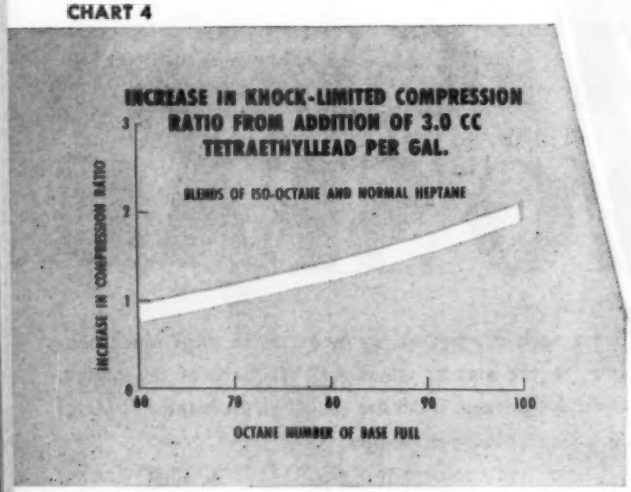
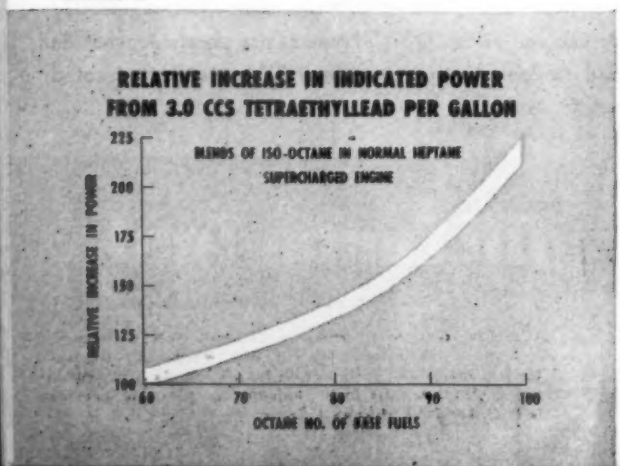


CHART 5



A BETTER WAY

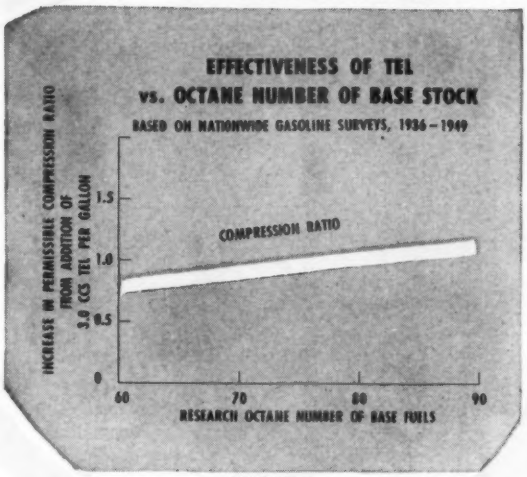


CHART 2

heptane and iso-octane in different proportions. When added to the 60 octane fuel, 3.0 cc tetraethyllead allows an increase of 0.9 compression ratio, but the figure is increased to 1.66 ratio when the same quantity of tetraethyllead is added to a 90 octane fuel.

The increased contribution of tetraethyllead to the higher octane fuels is also realized when the benefit is taken in the form of higher intake-manifold pressures (supercharging). Chart 5 shows the relative increase in indicated power made possible in a supercharged engine by the addition of tetraethyllead to blends of iso-octane and heptane. When added to the 90 octane base fuel, the tetraethyllead permits about one and two-third times as much additional power to be taken from the engine as when added to the 60 octane fuel.

The unusually large improvement in effectiveness of tetraethyllead with increase in fuel antiknock quality, as illustrated in Charts 4 and 5, is obtainable with fuels having a considerable range of hydrocarbon composition.

Later messages in this series will deal with the effectiveness of tetraethyllead when added to the four basic types of fuel hydrocarbons. Such studies serve to explain the varying behavior of tetraethyllead in commercial gasolines. More important, they point the way toward a more effective use of tetraethyllead in the future.

CHART 3. This chart shows that the units going up the octane scale become larger and larger in terms of permissible increase in compression ratio.

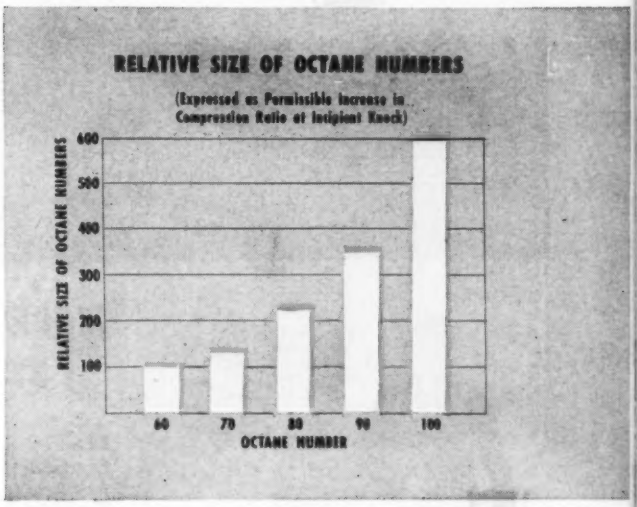


CHART 3

Since 1923—*continuous research to provide better antiknock service*

ETHYL CORPORATION
RESEARCH LABORATORIES

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ETHYL CORPORATION

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MORE and MORE WELLS ARE PUMPED BY *LCP EVERY DAY!

Yes, sir . . . that's me they're talking about . . . *LCP! My AUTOMATIC CONTROL releases manpower, cutting payroll costs. Continuous, trouble-free operation reduces maintenance costs, too. I can take on 24-hour duty or work according to any fractional time schedule—that means you pay only for the power you use. Switch to tireless automatic *LCP! I'll do the job better—for less! Ask the Power Engineer of your Utility Electric Power Company—he'll tell you!

*LOW COST POWER

PETROLEUM ELECTRIC POWER ASSOCIATION

UPPER WILCOX
COPELAND CREEK FIELD
POLK COUNTY, TEXAS

Mud (Baroid, Quebracho, Aquagel): R_m = 1.2 @ B.H.T.
Bit Size: 9⅞"
Spacings: AM = 16"
AM' = 64"
AO = 18' 8"

15

This is another in a series of interpreted electrical logs from identified formations and fields which Schlumberger will reproduce in this publication. If you would like to keep this entire series, please write to us on your letterhead and we will be glad to send you a reprint of this log (and preceding logs in this series) with a binder in which you may file subsequent logs as they are published. This series is made possible through the courtesy and cooperation of the oil operators who have released these logs.

LOG ANALYSIS

1) Water saturation S

R_o = 0.8 ohms from neighboring well where sand is below water level. This value is used in calculations for both levels.

R_t = 19.0 ohms — Level A
R_t = 11.0 ohms — Level B
Bed thickness requires resistivity corrections for both levels.

In "A" Sand: $S = \sqrt{\frac{0.8}{19}} = 22\%$

In "B" Sand: $S = \sqrt{\frac{0.8}{11.0}} = 27\%$

2) Formation water resistivity R_w

$SP = -70 \log_{10} \frac{R_m}{R_w} = -95$ mv.,

This value used for both levels. SP in Level B is increased by 5% because of bed thickness.
R_w = 0.052 ohms at B.H.T.

3) Porosity p

$F = \frac{R_o}{R_w} = \frac{0.8}{.052} = 15.3$

$P = \sqrt[m]{\frac{1}{F}} = 22\%$ for m = 1.8

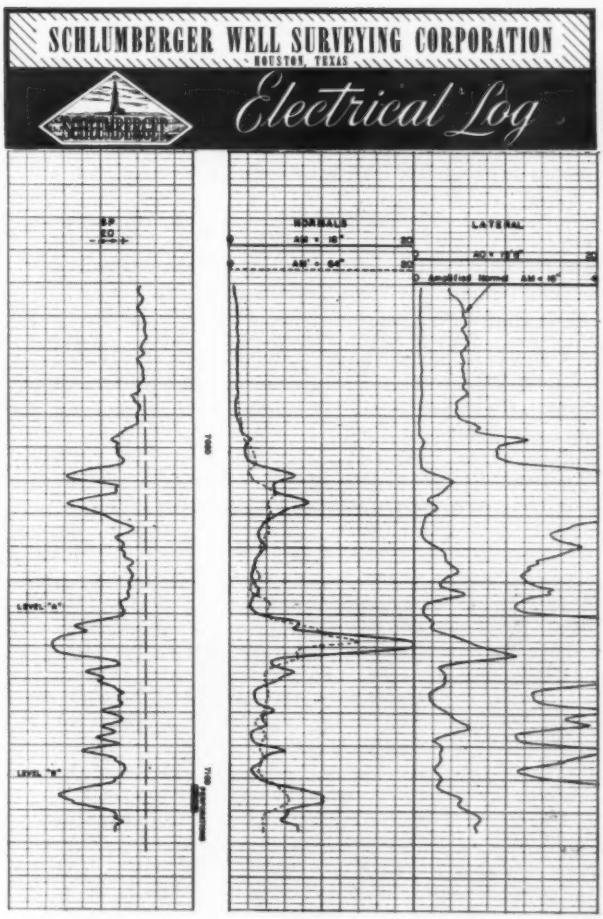
Same Values used for both levels.

CORE ANALYSIS

Level A	Porosity	22%
	Permeability	207 md
	Residual Water	46.0%
	Residual Oil	1.4%
	Connate Water	32%
Level B	Porosity	24%
	Permeability	359 md
	Residual Water	41.5%
	Residual Oil	14.9%
	Connate Water	31%

PRODUCTION RESULTS

Perforated:	7102-10'
Initial Production:	147 BOPD 37.2° API
Gas/Oil Ratio:	1970/1
Water:	None



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HOUSTON

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PROVIDES CONSTANTLY ADVANCED SERVICES TO THE OIL INDUSTRY

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PB CASING PROTECTORS INSTALLED FROM TRANSFER SLEEVE TO DRILL PIPE IN LESS THAN FOUR SECONDS!

PB engineers fastest protector installation tools

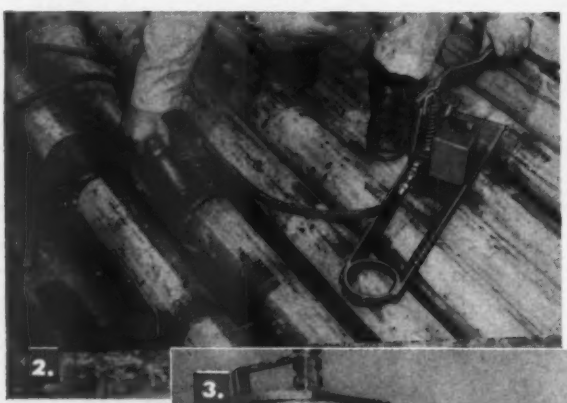
NOW AVAILABLE—PB's new lightweight hydraulic equipment installs protectors in a fraction of the time previously required . . . *from transfer sleeve to drill pipe in less than 4 seconds!*

One man can install protectors on drill pipe wherever or whenever needed—going into or coming out of the hole without breaking joints of a stand—or on the rack at your yard or at the rig.

This combination of PB "Field Proven" Protectors and new PB Hydraulic Push-Off Installation Service means *full* protection plus *money saved.* You save rig time—get on bottom quicker!

For a demonstration of this "years ahead" PB engineered installation equipment call your PB representative now.

1.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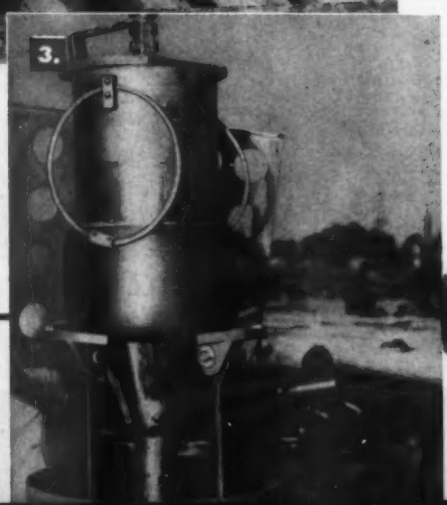
3.

1. New PB Hydraulic Push-Off Tool operated by PB service man while the crew is running pipe. Three strokes of the Push-Off Tool (controlled by foot pedal) give a hydraulic jack action which transfers the protector from sleeve to drill pipe in less than 4 seconds.

2. PB Protectors installed on racked pipe. Note how Push-Off Tool pump pedal is operated by hand.

3. Polished cone serves as expanding surface as the protector is hydraulically put on the transfer sleeve. New PB equipment is exceptionally light in weight—unloaded transfer sleeve for 4½" drill pipe weighs only 9¾ lbs.! This allows easy, quick handling by installation man.

PB

Patterson-Ballagh

Division of Byron Jackson Co.

MAIN OFFICE: 1900 East 65th Street
Los Angeles 1, California

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Gas engines, too must be kept clean

USE GULFLUBE MOTOR OIL H.D.

The heavy duty detergent oil for tough lubricating jobs

Here's an oil that offers "behind-the-ears" cleaning action for power cylinders in oil field pumping units — Gulflube Motor Oil H. D. It helps keep valves and rings clean and free—prevents formation of harmful deposits on internal engine surfaces.

Gulflube Motor Oil H.D. is a quality heavy-duty detergent oil, performance proven in thousands of automotive, industrial, and marine engines. It's the ideal oil for tough lubricating jobs.

You get an important plus value when you use Gulflube Motor Oil H.D.: the helpful counsel of Gulf Lubrication Engineers, specialists in scientific gas engine lubrication. Write, wire, or phone to:

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The Best Advertisements of GASO PUMPS Are The Cost Records of Users!

GASO PUMPS

2000 SERIES

Mounted on trailers or skids — ideal for permanent or semi-permanent pipeline stations, water service, or pick-up in case of line breaks.

for every oil industry need

Models to fit every need and condition; design that eliminates useless weight and parts; life and performance that continue to amaze cost-conscious operators — these are and always have been Gaso trademarks. They explain the worldwide preference of pipeline men for Gaso Pumps. Write for catalog.

GASO PUMP & BURNER MFG. CO.

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Change Now to S/V Sovabead

The sooner you get these hard-working beads in your dehydrator, the sooner you'll get greater efficiency . . .

This new Sovabead team is ready now to give you all the benefits of a vastly improved desiccant for natural gas dehydrators.

Why wait until your present drying agent is completely inactive before you change?

Here's what you can get immediately:

S/V Sovabead increases the capacity of your units (almost double). It maintains this capacity at high temperatures (as high as 120° F.) with low effluent dew point.

S/V Sovabead dries sour gas, with a longer bed life. It eliminates caking and reduces channeling, dusting and pressure drops in the bed.

Reactivation is quick, easy, and economical.

Get the facts today from your Socony-Vacuum Representative.

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Socony-Vacuum Process Products

Process Products
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OIC

PACE SETTER IN VALVES

Engineered FOR LASTING SERVICE

200 LB. UNION BONNET BRONZE GATE VALVE

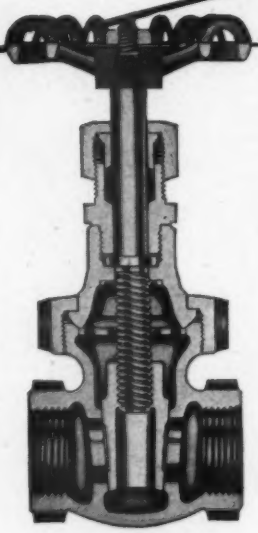
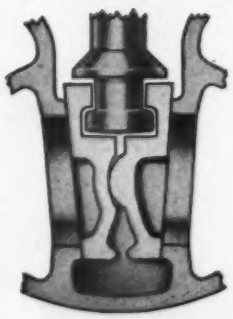


FIGURE NO. 7208 Non-rising stem, integral seat, OIC nickel alloy solid wedge, screwed end type.

FIGURE NO. 7200 Rising stem, integral seat, OIC nickel alloy solid wedge, screwed end type.



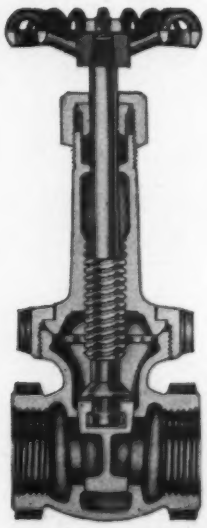


FIGURE NO. 7202 OIC Nickel Alloy double taper wedge automatically adjusts itself to its seat as valve is closed.

DESIGN: Solid wedge, rising stem; double-tapered wedge, rising stem; or solid wedge, non-rising stem. Integral seat, screwed end design.

BODIES: Of Steam Bronze ASTM B61, with average tensile strength of 40,000 lbs.

BONNETS: Also of Steam Bronze, with seal on lower end which mates with corresponding surface on stem to allow valve to be packed while fully open and under pressure. Condensing chamber below the stuffing box to keep packing cooler on high-temperature lines.

GATES: Of two types.

SOLID WEDGES are OIC copper nickel alloy, are of I-beam design, and reversible.

DOUBLE-TAPERED WEDGES fit into same bodies, but have ball and socket design, allowing wedge automatically to adjust itself to seat as valve closes. Accurately machined guides on both types, and tapered seating surfaces to give full contact with body seats as the wedges wear.

STEMS: Of manganese bronze, with double Acme thread for quick traverse of the wedge. Diameters sufficient to bear torsional loads greater than strongest hand pressure and to withstand severe operating conditions.

SEATING SURFACES: Machined to five-degree, self locking angle.

HANDWHEELS: Of ventilated malleable iron, finished in black enamel.

RATINGS: For steam at 200 lbs., 550 degrees F.; for cold water, oil, or non-shock gas service at 400 lbs. Shell tested at 500 lbs. and seat tested at 400 lbs.

SIZES: One-fourth inch to three inches currently available.

Special **INTRODUCTORY OFFER**

Check this 200-lb. Union Bonnet Bronze valve. Send us the size, and we'll deliver you a sample on memo billing. Keep it 30 days, take it apart, analyze it, test it. After you've examined all its superiorities, you may return it, if you wish, for full credit.

OIC **VALVES**

THE OHIO INJECTOR CO.
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KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	8⅝" to 22" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅝" to 12¾" O.D.	Up to 55'	.188" to .400"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	24" to 30" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser

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Service
Dependability

AND *Manufacturing* COMPANY

TULSA, OKLAHOMA

Stores in Kansas, Oklahoma, Texas,
Louisiana, and New Mexico

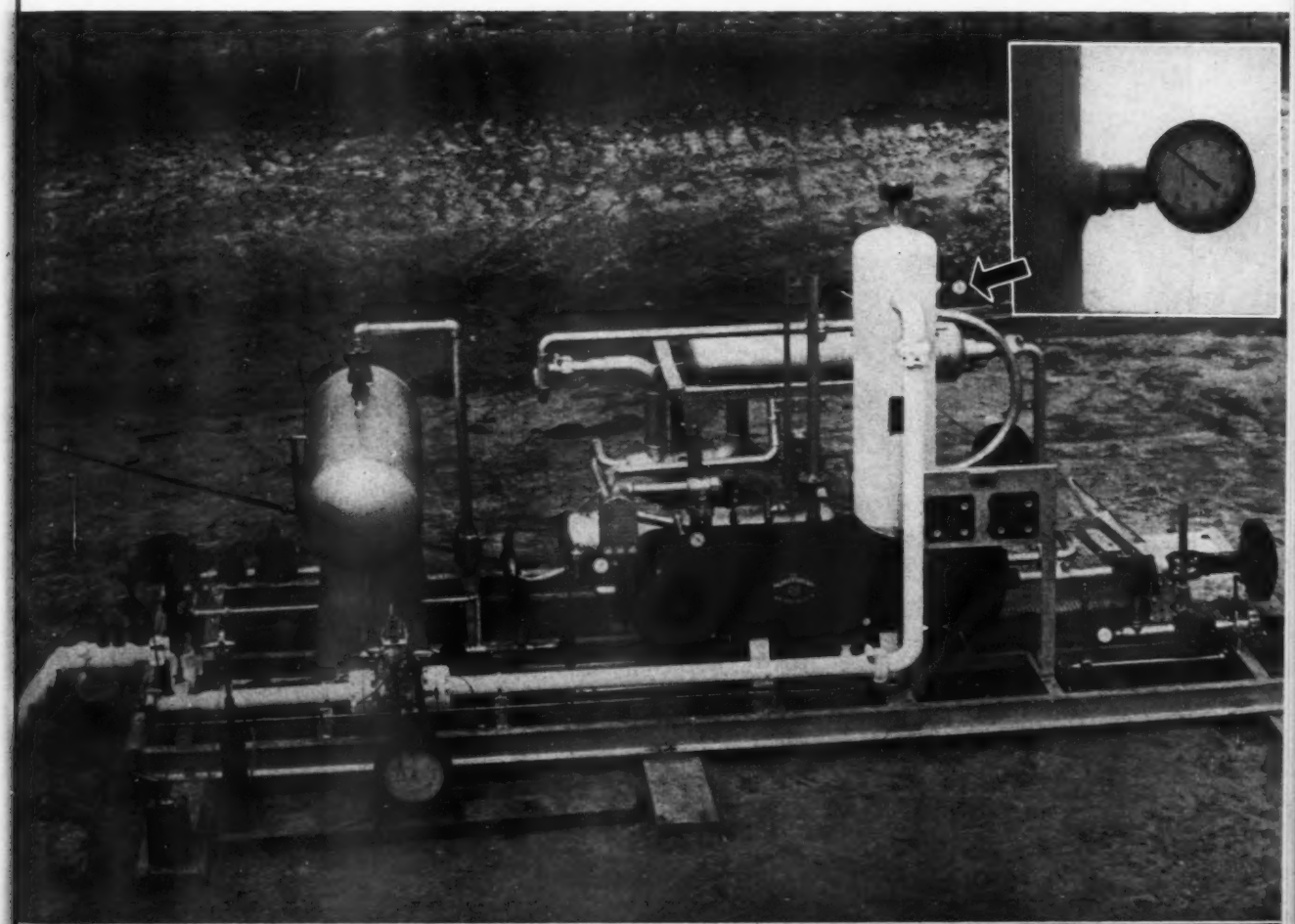
3 YEARS OF FIELD TESTING
BEHIND THE PARKERSBURG HYRECO PROCESSING UNIT...

So completely revolutionary is the Parkersburg Hyreco Processing Unit, that its introduction to the industry was withheld for three years while its design and performance could be proved by actual field service.

These years of testing proved that Hyreco Units will operate at zero and lower separator temperatures—optimum conditions for increased recovery of hydrocarbons—without freezing separator or flow system. They have proved you can expect 10% to 25% increased liquid hydrocarbon recovery from high-pressure gas wells with net earnings from condensate sales increased as much as $900.00 per month.

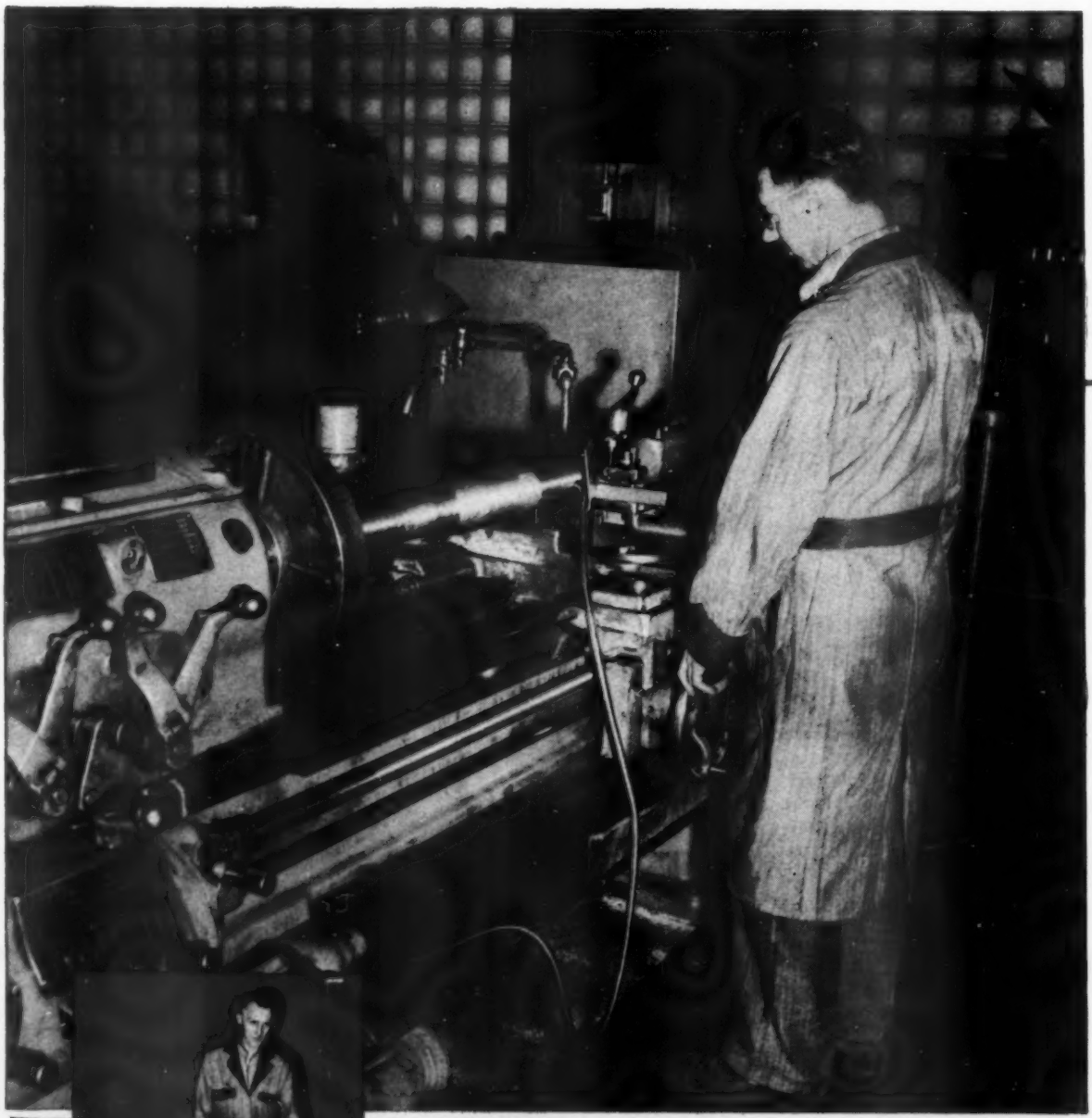
They have also proved that in addition to extra revenue, savings in operating costs further increase net profits. The trouble, cost and fire hazard of operating a heater is eliminated. Hyreco Units require no heaters! There is no expensive down time due to freezing gas lines.

Be sure to get the complete facts about Parkersburg Hyreco Processing Unit, especially proved performance data based on three years of field tests. Ask your Parkersburg Representative. Write for Bulletins HR-550 and HR-650, containing complete information, specifications and performance records.



PARKERSBURG
RIG & REEL COMPANY • Parkersburg, West Virginia

Looking for better production



Here, a change to Free-Cutting CARILLOY FC

—increased production 14%

—increased tool life 300%

In producing the drum shaft for the winch of their famous "PIPE LAYER," Trackson Company, Milwaukee, formerly used 4¼ " round bars heat treated to 269-321 Brinnel. This vital part requires considerable machining to very close tolerances. Machining difficulties and low tool life ran up the cost and slowed production.

One of our metallurgists suggested the use of Carilloy FC. It worked like a charm, gave better machinability and better mechanical properties as well. Now they turn out more and *better* drum shafts and tools last four times as long.

on heavy-duty machined parts?

Speed up output and lower your costs with

U·S·S Carilloy FC

IF you are producing heavy-duty shafting or similar parts that require considerable machining and that must have tensile strength as high as 125,000 to 175,000 lbs. per sq. in. for heavy-duty service, U·S·S Carilloy FC offers you important advantages.

Carilloy FC is a deep hardening grade of manganese-chrome-moly steel. When heat treated to meet high mechanical property requirements, it will give you machinability and surface finish that *far excel* that of other alloy steels of comparable strength and hardness.

It is this feature of Carilloy FC that makes it so desirable from a production standpoint. For by buying Carilloy FC heat treated to your strength or hardness requirements, you obtain not only excellent machinability and tool life but you *eliminate the need for heat treatment after machining.*

Used in this way, Carilloy FC speeds up production, reduces costs, saves time and keeps reject losses to a minimum by eliminating the hazards of scaling and distortion. And, most important, Carilloy FC costs only a fraction of a cent more per pound than ordinary thorough-hardening alloy steels.

U·S·S Free-Cutting Carilloy FC is available in bar form, *either* quenched and tempered or annealed, in all sizes of rounds from ⅜" to 8¼" diameter.

This is not a new, untested steel. The ability of Carilloy FC to boost production and to cut costs by making it less difficult to machine steels of high strength levels has been amply demonstrated in some of the country's largest shops.

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COLUMBIA STEEL COMPANY, SAN FRANCISCO
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

CARNEGIE-ILLINOIS STEEL CORPORATION
Room 2145 Carnegie Bldg., Pittsburgh 30, Pa.

Please have a representative call to discuss U·S·S Free-Cutting Carilloy FC.

Name.....

Company.....

Address.....

City.....Zone.....State.....

USS

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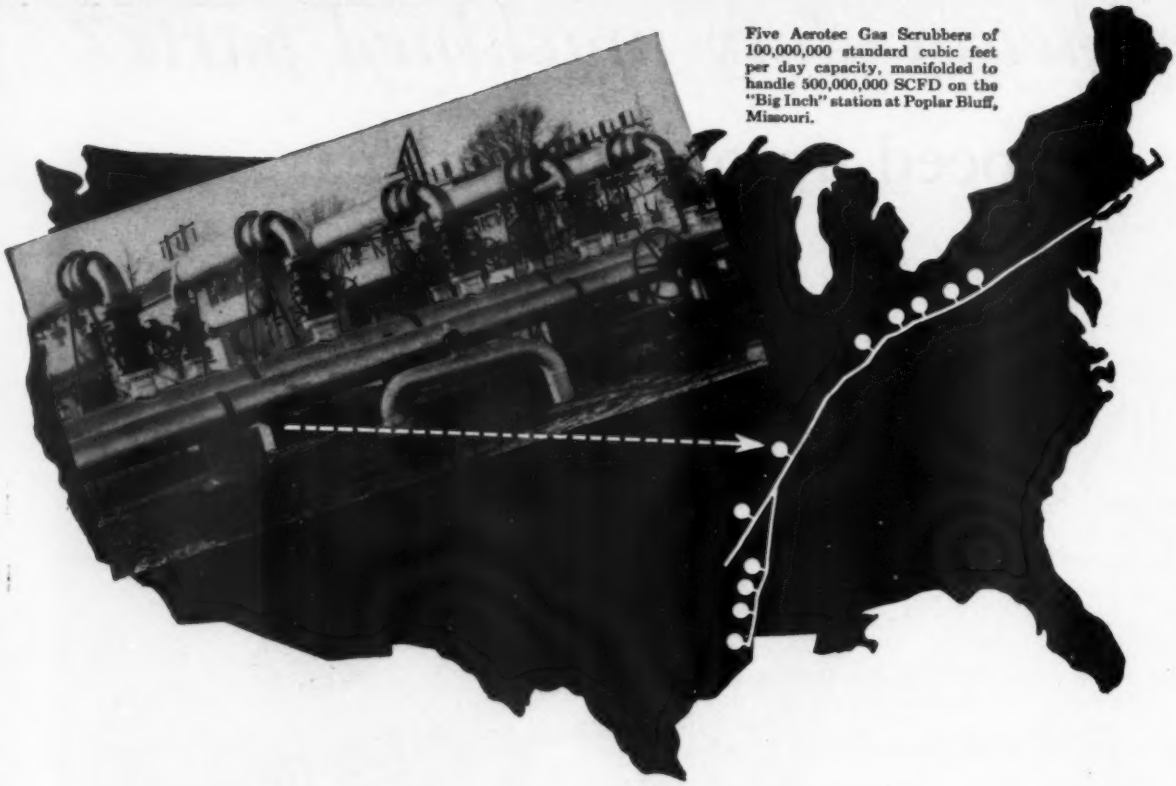

Five Aerotec Gas Scrubbers of 100,000,000 standard cubic feet per day capacity, manifolded to handle 500,000,000 SCFD on the "Big Inch" station at Poplar Bluff, Missouri.

THE INDUSTRY SPECIFIES:

AEROTEC *Dry* GAS SCRUBBERS

On the "Big Inch" pipeline and at the wells, Aerotec Gas Scrubbers are performing with unparalleled efficiency the job of keeping pipelines free of dust, liquid and distillates.

Based on a dry process of separating foreign material from gas, the Aerotec method eliminates the need for a cleaning medium, insures a minimum carryover of foreign matter into the gas stream. Units are available in practically any size up to 100,000,000 SCFD. Larger capacities may be handled by manifolding these standard units to any desired capacity.

Acceptance of Aerotec Gas Scrubbers is best demonstrated by the rapidly growing list of new users. Repeat orders prove that the Aerotec method is setting a new standard for an industry where maximum efficiency is required.

Complete information on this new method is now available.
Write for Catalog 501-2W today!

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They Say—

You'll love it less in December than you did in May!

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Money for Mexico

"There is as much justification for giving Mexico $100,000,000 to subsidize more potato imports as to overexpand her socialized oil industry. Both products are in oversupply here and loans of this type at our taxpayers' expense only serve to increase our taxes and destroy our jobs."

R. L. Foree, president, Texas Independent Producers and Royalty Owners Association.

In Defense of Bigness

"Those who claim that competition does not exist between giant firms do not know what they are talking about. The competition which goes on between large business organizations is as real as the struggle between contending armies in war. The very size of some units may give the impression that they are not struggling—are carried along by their own momentum. But if any concern ceases to compete, lags in its enthusiasm—or, as we say, isn't continually on its toes—the result in sales shows up promptly.

"It is interesting to note the smug detachment with which certain theorists, both in and out of government—including some on the bench—undertake to decide questions about business with a magnificent indifference to, and in many cases an appalling ignorance of, the daily difficulties which face a businessman who tries to satisfy his customers, outwit his competitors, and in addition there-

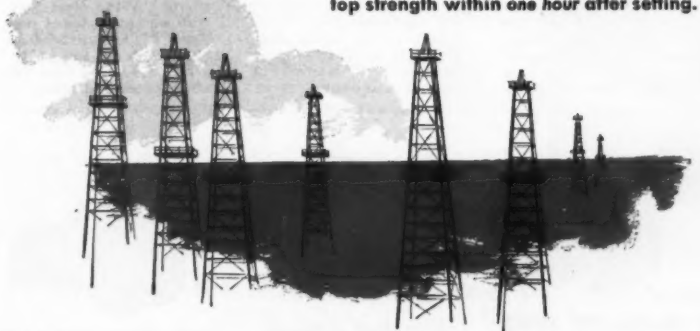
When a shot tamp is needed...

Call for Cal-Seal

U.S.G.'s super-strength gypsum cement

Here's why—for this vital HOWCO service—the call's for CAL-SEAL:

- Increases the effectiveness of the shot. Confines the force of the explosion to the pay zone. Protects the casing.
- Expands as it sets to form a tight plug.
- Faster, easier clean out. CAL-SEAL permits quick resumption of operations.
- Short delays. CAL-SEAL sets quickly; reaches top strength within one hour after setting.



HOWCO crews, working with the newest, finest equipment, use CAL-SEAL to do special oil well cementing jobs quickly, dependably. United States Gypsum has been making CAL-SEAL since 1938 for super strength and stabilized, controlled set. It's teamwork like this —combining technical knowledge, expert service, and years of experience—that helps give you increased oil production.

Halliburton Oil Well Cementing Company

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CAL-SEAL is a trademark reg. U.S. Pat. Off. for a super-strength gypsum cement manufactured by U. S. Gypsum Co.

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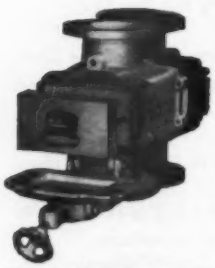
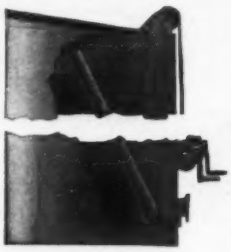
FOR *Every* TANK OPENING

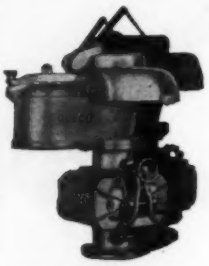
● Installing Oceco's gas-tight, fire-safe fittings on *some* of the openings on your tanks — and then using inferior fittings on other openings — is like wearing only one shoe. Specify Oceco Fittings for *all* openings on *all* tanks and get the *full protection* that only Oceco Tank Fittings can give you. Send for the Oceco data sheets. They give complete information on sizes, weights, prices, etc. *Write today.*



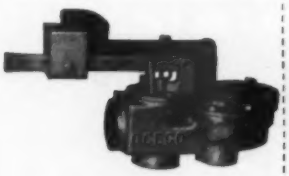
TYPE "E" FLAME ARRESTORS can withstand long exposure to fire. The "banks" have vertical straight through passages — minimizing entrainment and pressure drop, and are "extensible" for easy cleaning. 2" to 10" sizes.



SWING LINE EQUIPMENT — complete facilities including heavy duty tank nozzles; efficient double elbow swing joints; swing pipes; cable clamps; cables; sheave brackets and internal or external winches.



TYPE "BE" VENT UNITS consist of a V-113 Vent Valve with snuffer, mounted on a Type "E" "Extensible" Bank Flame Arrestor. 2" to 10" sizes. Unsurpassed for efficiency and reliability.



V-109 STILL TYPE VALVES combine vacuum and pressure relief in a single valve. 3", 4" and 6" sizes. Pressure settings from 2 to 25 lbs. per sq. inch. Vacuum settings from 1 oz. to 10 oz. Temperatures up to 600° F.

OCECO ROOF MANHEADS provide a gas tight closure on the tank roof. White metal or composition seating ring. Furnished in 20" size only.

V-114 INTERNAL TANK VALVES are provided with a fusible link that melts when subjected to fire, closing the valve instantly, and cutting off the flow. 3", 4", 6", 8", 10", 12" and 16" sizes.

Please note the new address!

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to conform his activities to governmental restraint and regulation.

"We need not look askance on one who questions the perfection of our laws concerning competition," he told the association. "There is no holiness, no sanctity, in any individual man-made law."

Charles Sawyer, Secretary of Commerce, addressing Twentieth National Business Conference of the Harvard Business School Association, Boston.

Note to Congress

"The Supreme Court's logic in putting aside Texas' claim to offshore oil should settle any lingering doubts. It should discourage any further efforts in Congress to turn these vital reserves over to the private oil companies by forfeiting national dominion to the states.

"This newspaper has said in the past that it believed Texas had a stronger claim on offshore oil than any other state, because of the specific terms under which it was admitted to the Union. After reading the closely reasoned majority opinion written by Justice Douglas we are persuaded that Texas' claim was no stronger than any other state's. . . .

"After this decision, it would be difficult to see on what grounds Texas, Louisiana, California or any other state could argue that Congress should quitclaim its dominant interest in offshore oil. . . .

"Can any member of Congress afford to propose breaching national rights when to do so would impair the discharge of national responsibilities, oppose national interests, and in the end endanger national security? The answer to that question should by now have become so obvious that any further quitclaim agitation in Congress would be as impolitic as it has always been unstatesmanlike."

Editorial in the St. Louis Post-Dispatch.

Ready for Anything

"It is indeed a comforting assurance to the people of the United States to know that our domestic fields have been developed and are ready at an instant's notice to supply all foreseeable estimated petroleum requirements to meet our military demands and essential civilian uses."

Frank Porter, president of the American Petroleum Institute, in a statement on oil supplies.

Toward Better Relations

"The oil industry is not monopolistic. It is the most competitive industry in this country. Oil people fight it out toe to toe from the oil well to the service station. It is the most progressive industry technologi-

cally in the world. It pays the highest wages and offers the best security of employment of any industry. It serves basic needs of our people. It performs the miracle of bringing to the public petroleum products at the street corner or their doorstep, after a journey of thousands of miles, from the bottom of an oil well, through the myriad pipes of a refinery, to the place where the customer wants the product.

"We should all be proud of belonging to this industry, should learn all we can about it, and tell people the truth about this industry in which we spend our lives and support our families."

W. T. Holliday, chairman of the board, Standard Oil Co. of Ohio, writing in the Sohioan.

Top Ten Producers

"If we . . . consider the industry purely from the standpoint of crude production, it is interesting to know who the 10 largest producers of crude in this country are and how they rank. . . .

"It will be noted that in each of the three periods (1949, 1948, and 1943), Humble stood No. 1, Standard of California has come up from No. 6 to be No. 2, Texas Co. is No. 3. Sun Oil has moved up from No. 14 to No. 10, and Phillips Petroleum from No. 12 to No. 9.

PER CENT OF U. S. PRODUCTION

	1949	1948	1943
Humble	5.38	6.67	5.38
Standard California	4.86	4.88	3.52
Texas Co.	4.74	4.78	4.77
Gulf Oil	3.84	4.27	3.69
Shell	3.74	3.87	4.50
Standard Indiana	3.61	4.01	3.37
Socony-Vacuum	3.27	3.37	3.75
Continental	1.88	2.01	1.96
Phillips Petroleum	1.87	1.97	1.64
Sun Oil	1.64	1.86	1.20

"These 10 companies collectively in 1949 produced 34.82 per cent of all the crude oil brought above ground by the oil industry. It is a remarkable diversity and it shows very vividly the lack of concentration there is in the crude-oil industry."

Market Observations, Harris, Upham & Co., New York.

West Coast Rebuttal

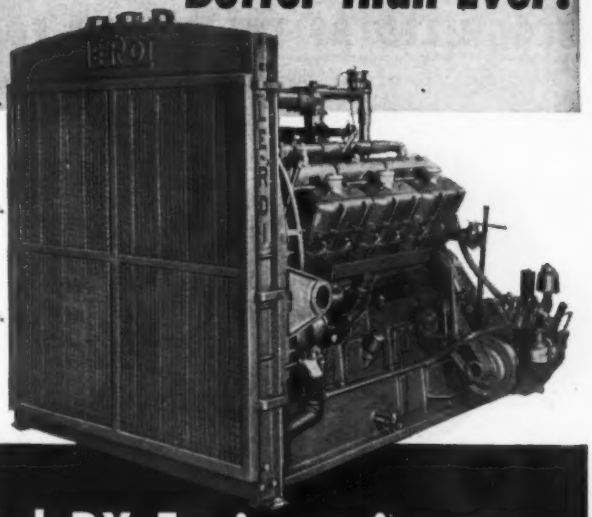
"The literary style of the complaint is the usual one, a combination of a Hitler speech and a Pravda editorial. The remedies are of a mixed nature—some disastrous to the public interest, some contradictory to others, some impossible, some just foolish."

Robert L. Minckler, president, General Petroleum Corp., speaking on the Government's antitrust suit against West Coast oil companies before the Portland Chamber of Commerce forum.

LE ROI MILWAUKEE

Old Favorites—Now Better than Ever!

L-3000 235-410 hp.
H-2000 158-270 hp.
F-1500 118-205 hp.
D-1000 79-138 hp.



Improved RX Engines give you:

1. Simplified Carburetion — Single carburetor and air cleaner on 4, 8, and 12-cylinder gas-fuel engines make fuel distribution uniform for greater economy and smoother operation. Accurate adjustments are easily made.

2. Re-designed Pistons and Block — Light aluminum pistons with full-floating piston pins reduce reciprocating weight to give you smoother operation and faster acceleration. Cylinder block made sturdier to last longer. Withstands punishment of oil-field handling better than ever.

3. Full-flow Oil Filtering — The use of full-flow and by-pass oil filters screens out dirt and purifies the oil. Full pressure lubrication forces this clean, life preserving oil to all moving parts.

One basic, standard stock of parts fits the whole line of RX engines. This, coupled with outstanding design, assures you of faithful dependability and lower operating costs. Four sizes from 79 to 410 hp. Write for new bulletin just off the press.

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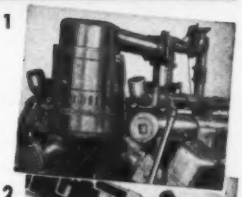
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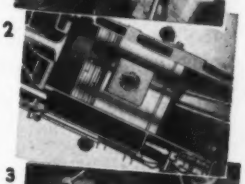
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RECOGNIZED AS THE LEADER FOR YEARS

For many years Tretolite has been recognized as the acknowledged leader in the chemical resolution of oil field emulsions. This recognition has been won by the uniformly high level of effectiveness of Tret-O-Lite reagents, plus the consistent and always-available helpfulness of Tretolite service engineers. To provide the best service possible, Tretolite also offers a group of proved reagents designed to mitigate many of the costly nuisances encountered in the production of petroleum.

TRETOLITE *Water De-oiling Chemicals*

Tretolite water de-oiling reagents are designed to resolve oil-in-water emulsions. The effective treatment of oil-in-water emulsions make possible the salvage of valuable oil, and provides relief from stream pollution problems.

SOLVO *and* PARASOL *Paraffin Removers*

Solvo and Parasol effectively remove accumulations of paraffin from pumping wells, flowing wells, and flow lines. The use of these chemicals saves the cost of mechanical scraping. They are safe to use, harmless to equipment and economical.

KONTOL *Corrosion Inhibitors*

Kontol corrosion inhibitors combat and inhibit the corrosion of metal production equipment in oil, gas, and gas condensate wells.

S.P. *Scale Preventives*

S. P. scale preventives inhibit the adherence of scale-forming inorganic solids on the metal surfaces of pumps, pumping equipment, flow lines and traps.

For further information on any of the above Tretolite products, ask your Tretolite engineer or write to

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Dehydrating • Desalting • Corrosion Inhibition • Scale Prevention • Water De-Oiling • Paraffin Removal

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Is That Funny?

ONE of the biggest headaches of the editing and publishing racket is trying to figure out what the readers like and don't like. This may be an astounding statement to a person who has never tried it.

You may say: "Why, every editor ought to know that. If you don't know what the readers want you've got no business being an editor." Maybe so, maybe so. Perhaps we all should have stayed on the farm. But we know plenty of other editors of other publications who have spent their lives trying to find out what the readers want and were never quite sure they succeeded.

We will admit to having a pretty fair idea of what our readers like and don't like, but only pretty fair. There's no exactness in this business. One man's meat is another man's poison. A few readers tell us they like a certain feature and others tell us they don't like it, but most of them never let a peep. So we have to play by ear a good deal of the time.

Take, for example, the matter of cartoons. A year or more ago this staid old publication took what was for us a revolutionary step. We began printing a cartoon every week. We started by quietly tucking it in among the ads to test reader reaction. It's still there because we got no reader reaction, good, bad, or indifferent.

Among our thousands of readers one or two admitted they got a smile out of it occasionally, while a couple of others have given us to understand that as a comic magazine we rate quite a few notches below the New Yorker. But for all the tangible evidence we have we might as well conclude that 99 44/100 per cent of our readers have never even noticed the cartoon.

See what we mean? If we knew that a number of our readers like the cartoon we would keep running it and not worry about it. Or if a lot complained that it's lousy we would drop it quick and forget it. It's the constant uncertainty that gets us down. Maybe we should have stayed on the farm.

Hobby Horse

A GOOD trade mark can do many things for an oil company in addition to selling gasoline, and one of the hardest workers in extracurricular activities is Pegasus, Socony-Vacuum's flying red horse, about whom this department has written on previous occasions.

Pegasus' most recent chore was to conduct "The Flying Red Hobby-Horse Show" in cooperation with his stable keepers, the Pegasus Club of the New York office. For this job he flew down out of the stratosphere and mounted a set of plebian rockers.

But Pegasus didn't mind this indignity. He reasoned that hobbies help to keep his human associates in better shape to work for him and also prepare them to enjoy their future retirement, in which he has quite a financial stake. The humans loved it, and exhibited an infinite variety of after-work diversions, none of which had the remotest connection with the oil business. One of the entries was a collection of ship models turned out in the home workshop of President B. Brewster Jennings — and not a tanker in the lot.

Superservice

A DRUG store that carries everything but drugs has long been a favorite subject for gagsters, but now a group of oil companies are cooperating to run a service station with all the usual facilities except gasoline pumps.

It has been built at the Chicago fair, which just opened and will run all summer. Like all super service centers it will offer free air, water, and information; clean rest rooms; telephones; checking facilities; picnic tables; and even free movies (on oil subjects). Of course it won't sell any gasoline, but think of the swell buildup.

—Henry D. Ralph

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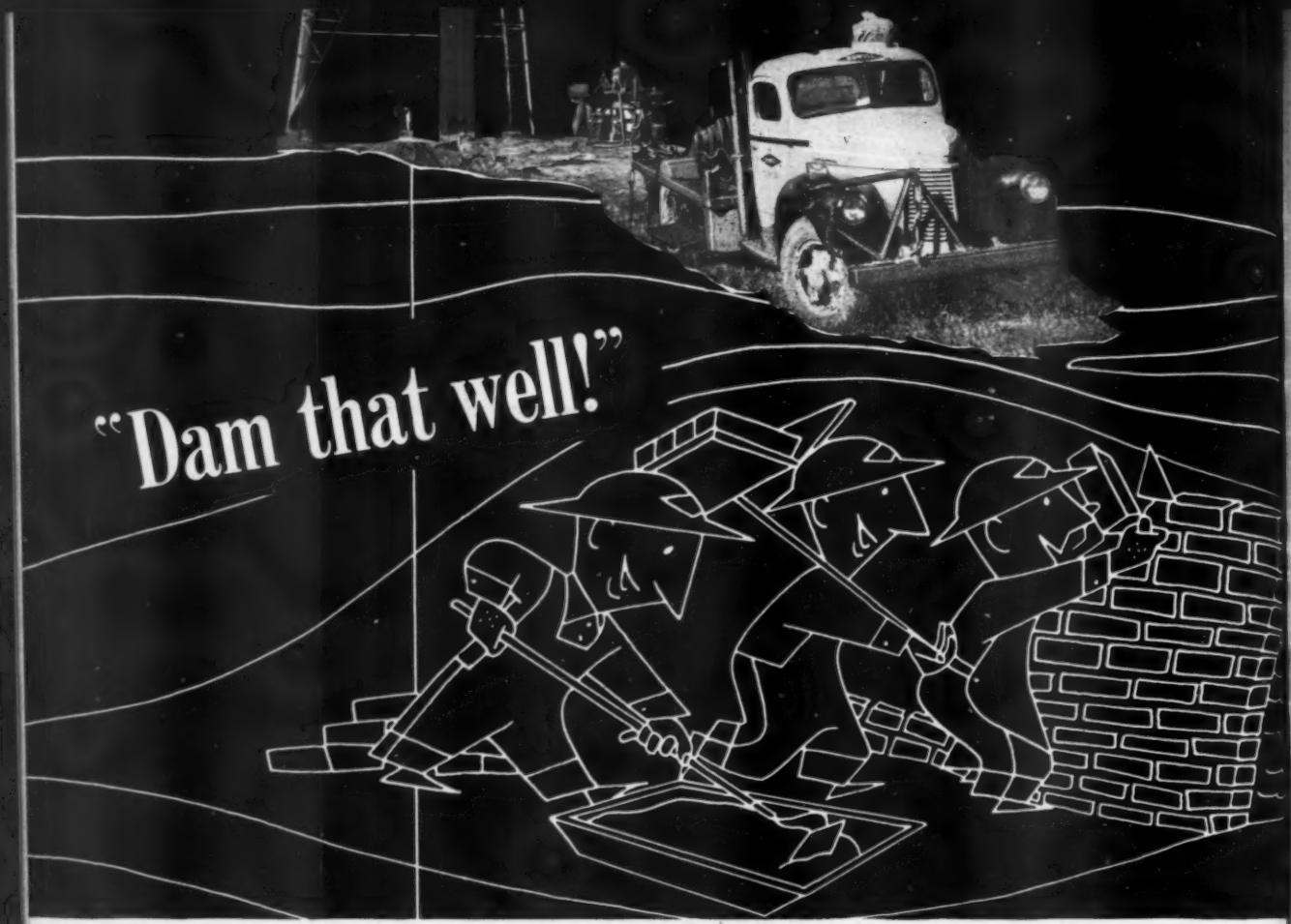

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Dowell Plastics have proved themselves ideal for many workover and recompletion jobs. If necessary, the Dowell Electric Pilot is used to determine the well's permeability profile and the sources of fluid entrance. Then, the Dowell engineer uses a specially engineered bailer to spot the plastic in the right place. The plastic enters the well as a fluid . . . then becomes an impervious solid at a predetermined time. Dowell plastics provide excellent bonding and penetrating qualities that form a permanent dam against encroaching fluids.

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FOR OIL INDUSTRY CHEMICAL SERVICE

the OIL AND GAS JOURNAL

VOL. 49, NO. 10 JULY 13, 1950

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NO OTHER EQUIPMENT — no other method of cementing — provides such assurance of successful "first-time" cementing as the exclusive Baker Principle of *whirling* the cement up and around the casing which is effectively centered in the well with BAKER MODEL "G" CASING CENTRALIZERS.

Not only can you REMOVE BRIDGES which might stick the casing; not only can you wash the wall of the hole to help REMOVE MUD CAKE and leave the formation prepared for effective bonding with the cement to follow, but the *downward,* then *upward* ***whirling*** motion of the cement slurry REDUCES THE HAZARD OF CHANNELING TO A MINIMUM, and assures COMPLETE ENCASEMENT OF THE CENTERED CASING at the critical shoe joint with a uniform body of cement.

RESULTS ARE WHAT REALLY COUNT

When you use Baker Cement Equipment you *know* that the buoyant ball will seal against the resilient rubber ring (backed by sturdy interior construction) to provide a leak-proof back-pressure valve for floating those long, heavy strings of casing, and to seal instantly at the slightest reversal of pressure and prevent any return flow of the cement slurry. You *know* you will secure maximum cementing efficiency by the ***whirling*** cement slurry, combined with complete drillability. And you will enjoy that peace of mind which comes from using equipment of PROVEN DEPENDABILITY with a record of successful performance in thousands of wells under every imaginable condition.

You are assured of RESULTS when you use Baker Hook-Ups as pictured at right using a BAKER WASH-DOWN WHIRLER GUIDE SHOE (Product No. 121) with BAKER MODEL "G" CASING CENTRALIZERS spaced throughout the cementing area to provide *maximum centering force at the critical cementing point.* Then, with a BAKER CEMENT FLOAT COLLAR (Product No. 101 M & F) positioned a joint or two above the shoe, you have the world's best "float valve" for safety, plus a "stop" for the cementing plug so that cement tailings are retained inside of the casing.

For deeper wells, where maximum "floating strength" is a worthwhile precaution, a Baker Cement Wash-Down Whirler Float Shoe (Product No. 120) used on the bottom of the string will give you double safety at negligible extra cost.

Call the nearest Baker representative or office. Find out how dealing at Cementing Headquarters means SUPERIOR RESULTS FOR YOU.

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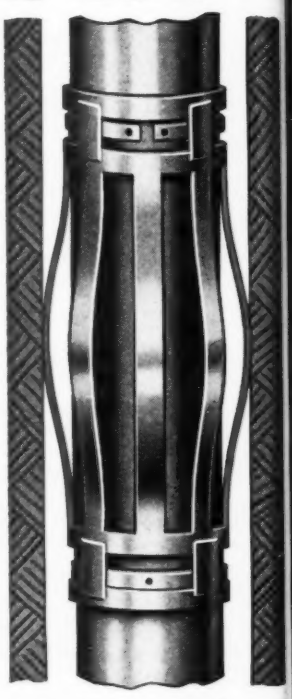
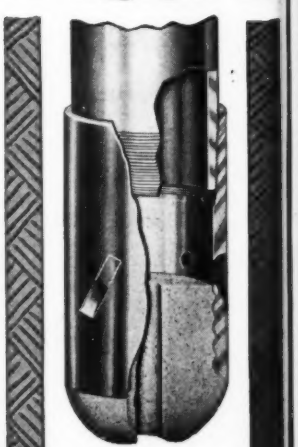
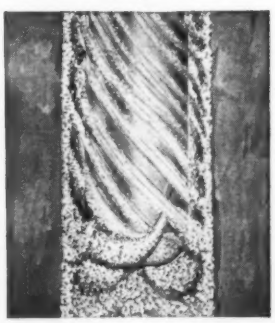




Here is visual proof of what *whirling* does for you...

The downward hydraulicking action of the circulating fluid through the baffled side down-whirler ports and the restricted bottom passageway, effectively remove bridges and permits safe running of the string of casing.

When washing the formation at the cementing point to condition the hole, the "whirling" motion of the fluid helps remove mud cake from side walls. This *downward* whirling is far superior to any *side jetting* action, and does not cause caving or crumbling of soft formations.



The "whirling" motion given to the cement slurry as it is discharged from a Baker Wash-Down Whirler Shoe causes the cement to encase the centered shoe joint with a more uniform body of cement, and reduces to a minimum the hazard of channeling.

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Preparedness

"Is this country as well prepared oilwise as it was just previous to its participation in World War II?"

This question is now being asked in official Washington and by many others who are fearful that a local crisis in the Pacific may shortly widen in scope to include the entire globe.

Our quick answer to this question at this time is that the oil business is ready to do its part as it was 9 years ago.

There are certain assumptions in this answer. In the first place it is assumed that existing petroleum facilities will be protected and transportation channels kept open, including the northern tier of South American countries and the entire North American Continent. Greater civilian rationing of certain petroleum products may be necessary than in World War II.

Finally there must be sufficient materials and equipment to provide for the steady development of proven areas and to carry on well-directed exploration programs. Plant and transportation units must be maintained.

In 1941 total demands in this country averaged 4,369,000 bbl. daily, of which 266,000 bbl. daily or 6.1 per cent was supplied by imports. By 1945 demands had jumped to 5,358,000 bbl. daily with 5.8 per cent imports.

For the first 4 months of this year, demands were 6,687,000 bbl. daily of oil with imports of 823,000 bbl. daily or 12.3 per cent.

The significant conditions revealed by these figures are the large increase in civilian consumption since the close of the war and the greater dependence on imports. For a time at least it is probable that in another war petroleum supplies from the Eastern Hemisphere, which averaged 106,000 bbl. daily the first 4 months of this year, would be cut off. Thus the free flow of petroleum within the Western Hemisphere during an emergency becomes of increasing importance.

This country has a backlog of approximately 1 million barrels daily in excess of current production. Additions to proven reserves since 1945 have exceeded production.

It should be pointed out, however, that whereas in 1941 a 1-million-barrel shut-in production represented a 25 per cent protection, the same figure this year amounts to only 15 per cent due to the large increase in demands.

To domestic supplies can be added the large new discoveries of Canada. By speeding up development and with more transportation the dominion could in effect be made largely self-sufficient in petroleum.

Refiners are in the best position in their history to produce the highest-octane aviation gasolines, with further improvement in quantity and quality of other essential war products, including jet fuels.

So this industry has fulfilled the promise made 5 years ago that if left to its own devices and freed of governmental restrictions, it would prepare itself for any emergencies that might arise.

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THIS WEEK

INTERNATIONAL—Pending agreement in Iran will greatly increase Anglo-Iranian's payments to government. . . . Arrangement, to be retroactive, awaits approval by parliament. . . . ¶Israeli officials reported trying to interest U. S. independents in exploration, refining in country. . . . ¶German officials propose use of idle hydrogenation plants to increase refined-product output. . . . ¶Aramco arranges with British Government for use of sterling in its operations. . . . ¶Contract let for Salgar-Bogota products line in Colombia. . . . ¶Shell authorized to build line in western Venezuela. . . .

ACTIVITY—Crude production for week ended July 8 averaged 5,407,950 bbl. daily, up 38,175 bbl. daily from previous week. . . . Well completions totaled 908 for the week compared with 823 last year. . . . Wildcat completions were down 21 to 158 but 24 wells greater than last year. . . . Rotary rigs operating in United States increased for the seventh successive week to reach 2,242 rigs on July 3. . . .

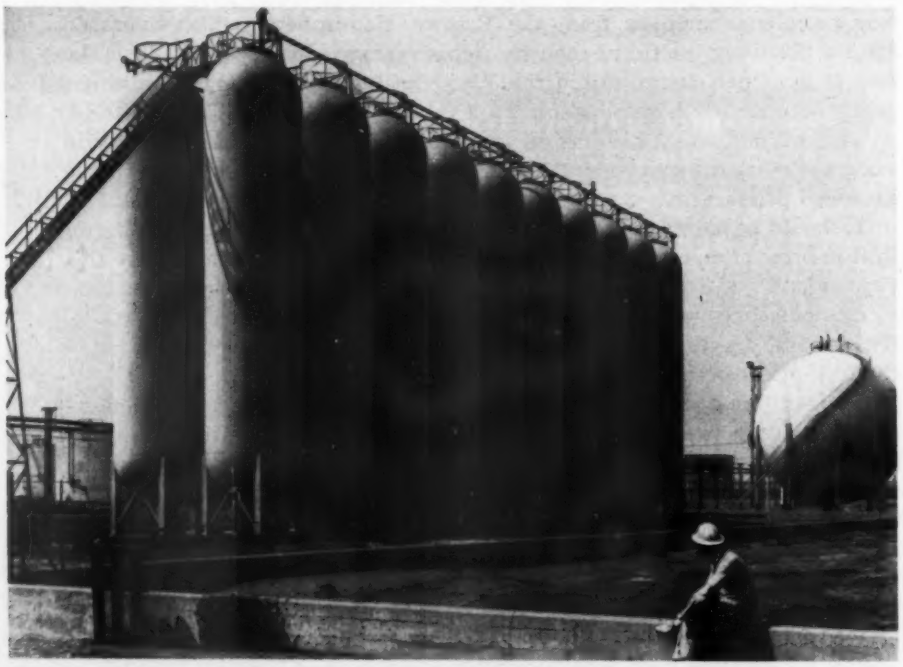
TRENDS—Stocks of crude and four major products on July 1 were 71,550,000 bbl. less than at the end of June last year. . . . Gasoline stocks were up 98,000 bbl. . . . Middle distillate and residual stocks were down 37,900,000 bbl. . . . Crude stocks dropped 33,748,000 bbl. . . . Most of the improvement in middle distillate stocks has been in past 4 weeks, up 14,700,000 bbl. . . .

GOVERNMENT—RFC moves to increase synthetic-rubber output by 88,000 tons annually. . . . Three plants ordered reactivated. . . . ¶Congress authorizes retention of Oil and Gas Division, provides for director, leaves matter of staff up to Interior Secretary Chapman. . . . ¶Provisions of tax-revision bill passed by House bring strong protest from industry groups. . . . ¶Three-year extension, $25,000,000 in funds asked for Bureau of Mines synthetic-fuels-research program. . . .

PIPE LINES—Ohio Oil Co. announces plans to begin work late this summer on big-inch crude-oil common carrier from Wood River, Ill., to Lima, Ohio. . . . First 226 miles to be in operation by end of year. . . . ¶First natural-gas crossing of Hudson River made. . . . ¶Susquehanna announces it will build a crude line from Toledo to a 125-acre site near Froomfield, near Sarnia. . . . Site was bought some years ago by Sun Oil Co. for a proposed refinery. . . . ¶Plantation Pipe Line Co. announces plans for products line to parallel existing line from Baton Rouge to Greensboro, N. C. . . . ¶Service Pipe Line Co. asks permission to build 24-mile crude line in Fremont County, Wyoming. . . .

NATURAL GAS—FPC authorizes East Ohio Gas Co. to construct underground storage facilities in northeastern Ohio. . . . ¶Five gas companies in Oil City, Pa., given permission by SEC to consolidate. . . . ¶Bill in Massachusetts Legislature, approved by administration committee, would put state government in gas-transmission business. . . .

INDUSTRY—Plans announced for 35-owner gasoline plant in Scurry County. . . . Sunray to be operator. . . . ¶Crude-oil production in California jumps 10,000 bbl. daily as result of price increase for low-gravity crude. . . . Estimated 100,000 bbl. daily still shut in. . . . ¶Annual 30-company study puts estimate of oil industry's assets at 30.2 billion dollars. . . . Figure places oil fourth in size of nation's economic segments. . . .



FUEL OF THE FUTURE?—Propane storage tanks, like these at the East Chicago, Ind., refinery of Cities Service Oil Co., may become a common sight if the use of propane as a motor fuel grows as fast as its boosters predict. The use of the liquefied petroleum gas is rapidly growing in favor with operators of farm tractors, construction equipment, city buses, and other fleet operators.

Assets: 30.2 Billion

Pogue-Coqueron analysis places oil industry fourth in size in nation, behind agriculture, railroads, utilities

NEW YORK.—Total gross assets of the petroleum industry in the United States are estimated to have reached 30.2 billion dollars at the close of 1949, according to a financial analysis of the industry by Joseph E. Pogue and Frederick G. Coqueron of the Petroleum Department of the Chase National Bank.

Main components of this total are current assets, 6.3 billion dollars; fixed assets, before deducting reserves, 23.5 billion dollars; and other assets, 0.4 billion dollars. Of the 23.5 billion of gross fixed assets representing the industry's investment in property, plant, and equipment, 54.4 per cent is in production, 14 per cent in transportation, 18.6 per cent in refining, 11.7 per cent in marketing, and all others, 1.3 per cent.

Fourth largest.—"These estimates indicate that the petroleum industry is one of the largest and most important segments of the American economy and, in terms of assets employed, is the fourth largest in the country, exceeded only by agriculture, the railroads, and the combined divisions of the public-utility field," the study commented.

The Pogue-Coqueron analysis dealt with the financial position of 30 leading American companies and also touched on general conditions in the industry during 1949. The companies considered produced approximately 53 per cent of the total crude for the United States last year while their domestic runs accounted for approximately 85.7 per cent of the United States total.

The year 1949 was a period of readjustment in the petroleum industry following the transition from the 1947 shortage to the 1948 oversupply, the study said. High, though not peak, records were established in production, earnings, and capital expenditures. The stabilization made during the year was a prelude toward the improved conditions which became apparent in the spring of 1950.

During last year, domestic prices of products decreased 12.2 per cent; crude prices declined 1.3 per cent; total demand for all oils remained virtually unchanged; and foreign operations were expanded. The net result was a reduction of 5.7 per cent in gross operating income of the 30 companies reviewed.

Income.—"The reported net income of the group amounted to 1,408 million dollars in 1949, a decrease of 27.0 per cent from 1948," the analysis said. "This result, expressed in prewar dollars, is equivalent to earnings of only 733 million dollars of 1935-39 purchasing power.

"The return on borrowed and investment capital employed by the 30 companies in 1949 amounted to 1,475 million dollars or 11.1 per cent compared with the 16.9 per cent in 1948. The productivity of the group's capital cannot be measured satisfactorily by the conventional calculated rate of return because this ratio is based upon two factors measured in different kinds of dollars. If the actual return for 1949 is adjusted to homogeneous dollars, the ratio is reduced from 11.1 per cent to 7 per cent.

"The cash dividends declared by the group for disbursement to its stockholders in 1949 totaled 564 million dollars, an increase of 18.7 per cent over 1948. This outlay represented 40.1 per cent of the available earnings while the balance of 844 million dollars or 59.9 per cent was retained in the business. It is estimated that 273 million dollars or 48.4 per cent of the dividends were absorbed by income taxes and by the increased living costs over the base of 1935-39."

Other data of interest in the report included the following:

Expenditures. — Capital expenditures of the 30 companies last year dropped 15.7 per cent from 1948 to 2,284 million dollars. Of this, 62.1 per cent was absorbed by the rise in construction costs from the prewar base of 1935-39.

The 30 companies spent 960 million dollars for domestic crude producing facilities. Disbursements of 63 million dollars for undeveloped lease rentals and 162 million dollars for exploratory expenses were charged directly to earnings. The total for exploration and development of crude reserves represented $1.22 for each barrel produced in the United States by the group. This compares to $1.21 similar per barrel expenditure in 1948.

During the year, charges for depreciation and depletion of plant facilities and properties of the group of companies amounted to 1,224 million dollars. This was based on original cost. Had such charges been based on replacement costs, they would have been 2,350 million dollars last year, and the reported net income (before deducting minority interests) of 1,475 million dollars would have been reduced by 1,126 million dollars to 349 million dollars.

Assets.—Total assets of the 30 companies amounted to 16,832 million dollars at the close of the year. The gross investment of the group in property, plant, and equipment at the end of the year was 19,183 million dollars, against which reserves of 9,201 million dollars have been set up.

This leaves an indicated net value of 9,982 million dollars. This latter figure, the analysis commented, is not realistic as a very large portion is stated on the basis of higher dollar

GROSS EXPENDITURES FOR PROPERTY, PLANT, AND EQUIPMENT OF 30 OIL COMPANIES—YEAR 1949

Department—	Thousand dollars		
	United States	Foreign countries	Domestic and foreign
Leases, wells, and equipment	995,667	196,420	1,192,087
Natural gasoline plants	101,027	1	101,028
Crude oil marketing	513	0	513
Natural gas	31,437	762	32,199
Total production	1,128,644	197,183	1,325,827
Crude oil pipe lines	122,969	14,298	137,267
Product pipe lines	6,387	0	6,387
Marine	69,580	7,932	77,512
Tank cars	2,729	0	2,729
Motor transport	5,441	380	5,821
Total transportation	207,106	22,610	229,716
Refining	388,538	63,915	452,453
Marketing	193,083	25,133	218,216
Others	55,781	1,956	57,737
Total—all departments*	1,973,152	310,797	2,283,949
*Includes:			
Additions to property accounts	1,797,625	273,813	2,071,438
Intangible development costs charged to income	24,031	321	24,352
Dry hole costs charged to income	127,924	36,663	164,587
Lease purchases charged to income	832	0	832
Other expenditures	22,740	0	22,740
Total	1,973,152	310,797	2,283,949

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purchasing power than is now prevailing.

Capital changes.—The group of companies increased working capital last year to 3,438 million dollars from 3,060 million dollars at the close of 1948. The increase was due principally to funds raised from borrowings. Borrowed and invested (equity) capital was 14,422 million dollars at the end of 1949. Of this, 18.0 per cent was in the form of long-term debt. This ratio represents a rise from the 17.2 per cent at the end of 1948.

During 1949, the companies obtained 641 million dollars from banks, insurance companies, and public investors. Of the total, 36.7 per cent was from public investors, 20.7 per cent from banks, and 42.6 per cent from insurance companies and other sources.

Of the 3,612 million dollars provided for the group of companies in 1949, 74.9 per cent was derived from earnings, 17.7 per cent from the issuance of stock and long-term debt, and 7.4 per cent from the sales of assets and other transactions. Of the portion disposed, amounting to 3,234 million dollars, 73.5 per cent went for capital expenditures and related business investments, 18.6 per cent for dividends to stockholders and minority interests, and 7.9 per cent for the refunding and retirement of long-term debt and preferred stock.

Production. — Combined world-wide crude production of the companies averaging 3,441,000 bbl. daily in 1949 was a decrease of 10 per cent from 1948. Domestic operations made up 2,672,000 net barrels daily of the total. Runs in foreign and domestic refineries of the companies averaged 5,240,000 bbl. daily, a drop of 1.8 per cent from 1948. Domestic refineries accounted for 4,570,000 bbl. daily of the total.

Gas-Industry Needs

Producers say well-head price should reflect competitive value in fuel markets; higher production costs are cited

ASIDE from the needed cleaning up of regulatory matters, three things are required in the petroleum industry to bring about a sound position for those who produce and transport natural gas. They are:

1. A recognition that natural gas is no longer a byproduct and should bear its full share of all costs pertaining to its finding and production as well as transmission.

2. The price of natural gas at the well should reflect its intrinsic value in the competitive fuel markets.

3. A campaign of education should be conducted so that representatives of the Government, the ultimate consumers, and everyone within the petroleum industry will properly evaluate all the factors that enter into the production, transmission, and distribution of natural gas.

The foregoing are points which are now being stressed by representatives of large and small producers who have made analyses of their positions in the present and future of natural gas. Analysts emphasize the fact that there can be no permanent solution of existing problems pertaining to natural gas until there is a recognition of these three basic conditions.

Comparative costs. — Relative to the cost of finding and producing natural gas, there is general agreement that an entirely erroneous conception has developed among ultimate consumers and among some government representatives as to natural-gas costs in the field.

It is conceded that the oil industry itself is partially responsible for this condition in that operators in the past have been inclined to think of natural gas as a supplementary or byproduct activity which should not be charged with its share of the costs of finding and producing crude oil. This attitude developed in several important areas over the years because there was either no market for the natural gas or the sale was restricted to a small percentage of the volume available.

The fact that demands have more than doubled over the past decade with further increases assured, is rapidly bringing changes in the attitude of operators in regard to natural gas.

Large expenditures are now being made in exploration for the sole purpose of determining possible gas reservoirs followed by the drilling of wildcat wells. Operators cite figures showing that the percentage of dry holes in these activities is comparable to that common to exploration tests seeking new crude-oil reserves.

Other analyses present significant data relative to the costs that should be charged against natural gas in carrying out the various types of conservation operations. With the exception of one or two states, the state conservation bodies are making every effort to reduce flaring or wasting of natural gas to a minimum, and there is evidence of the success of their programs everywhere.

But operators are in agreement that from their standpoint this reduction or elimination of waste has added to their costs, to the point in some instances where it ceases to be economic. In many cases there are no markets at present for the gas and the only way it can be conserved is to return it to the producing formations. Conserving gas until such a time as outlets are available involves additional costs which operators say should properly be charged against natural gas and not some other part of the producing operation.

Price of gas.—Oil producers cite various figures to show that natural gas is currently, and has been for some time in the past, selling below its competitive value in relation to other fuels. For example, the latest figures of the Department of Labor show that the index for bituminous coal is 193.5; petroleum, 109.5; and natural gas, 88.3.

These are wholesale indexes, but the same competitive situation exists at practically all the large fuel-consuming centers of the Middle West and East where natural gas is available. Comparisons based on therms in retail markets for the three fuels

ESTIMATED GROSS AND NET INVESTMENT IN PROPERTY, PLANT, AND EQUIPMENT OF THE PETROLEUM INDUSTRY IN THE UNITED STATES DECEMBER 31, 1949

	Million dollars		
Department—	Gross investment	Reserves	Net investment
Leases, wells, and equipment	11,750	6,350	5,400
Natural gasoline plants	725	275	450
Natural gas	300	100	200
Total production	12,775	6,725	6,050
Crude oil pipe lines	1,475	750	725
Product pipe lines	325	125	200
Marine	1,150	450	700
Tank cars	275	200	75
Motor transport	75	25	50
Total transportation	3,300	1,550	1,750
Refining	4,375	2,225	2,150
Marketing	2,750	1,100	1,650
Others	300	100	200
Total—all departments	23,500	11,700	11,800

usually show that natural gas is the lowest priced.

With this situation in mind, there are owners of important reserves in the Southwest, particularly Texas and Louisiana, who are refusing to enter into long-term agreements for the sale of their gas, hoping that later prices will be more in line with the competitive position of the product.

Another factor in this attitude of the producers, of course, is the regulatory situation applying to the Federal Power Commission. Many operators, because of the recent veto of the Kerr bill, fear that they would subject themselves to the controls of FPC should they enter into contractual arrangements covering the interstate movement of the gas they produce. However, aside from the confusion as to controls, many producers are refusing to sell, confident that 2 to 5 years from now they will be able to secure higher prices for their natural-gas production.

Public relations.—Most operators realize that advances in prices for gas, which would be reflected in retail prices, would bring reactions from consumers. It is agreed that the opposition from consumers was responsible for the veto of the Kerr bill which, if passed, would have assured that the production and gathering of natural gas by independent interests would be divorced from the interstate transmission of gas in determining costs as a basis for rate making by the FPC.

Producers explain that with prices more in line with competitive fuels at the well heads the actual advances to consumers would be small and there still would be savings for domestic, commercial, and industrial consumers over coal and, in many cases, fuel oil. It is also stressed that fair prices for natural gas in the fields would bring greater exploration and development activity and result in additions to proven reserves which are the consumers' guarantee of adequate natural gas for an indefinite period.

As explained by one large operator, "All we ask is an operating situation in which there can be a free play of competitive forces. With that background, we are confident that prices will adjust themselves on an equitable basis for producers, owners of transmission systems, the distributors, and the consumers."

Big-Inch Crude Line Planned

FINDLAY, Ohio.—Ohio Oil Co. this week announced it will begin construction this summer on a big-inch crude-oil line between Wood River, Ill., and Lima, Ohio.

The company at present operates a common-carrier system of multiple lines between Wood River and the Ohio-Pennsylvania state line.

The line, of 20 and 22-in., will replace existing lines, many of which have been in operation more than 40 years, the company said.

Completion of the first 226 miles from Wood River to Ohio's Harlos Gate plant near Sheridan, Ind., is expected before the end of the year, the company said. At Harlos Gate, the new line will tie into the company's existing facilities running to Lima pending completion of the new line to Lima.

Conyes Construction Co. has been given contract for two spreads of 74 and 98 miles, with the third spread of 54 miles to be handled by Bechtel Construction Co.

From Wood River the line will be routed through Patoka and Martinsville, Ill., continuing eastward along the general route of present lines.

O. F. Moore, manager of Ohio's pipe-line department, said the line, the only big-inch crude line between the St. Louis area and Lima, will provide shippers pipe-line transportation on an interstate and an intrastate basis.

More-Volatile Fuel

A.S.T.M. raises maximum vapor pressure for gasoline in northern states during winter months from 13.5 to 15 psi.

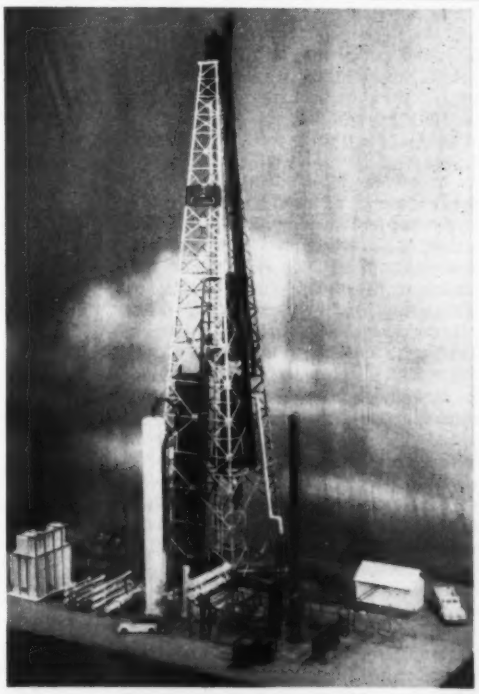
George Weber

REFINERS marketing in the northern states will have more latitude in blending their motor gasoline this winter.

This is a result of the action of the American Society for Testing Materials, at its recent fifty-third annual meeting in Washington, in increasing the maximum gasoline vapor pressure for northern states from 13.5 to 15 psi.

While the increase was restricted geographically and applies only to the winter months, its approval is considered by many in the industry as an important step toward further possible latitude on motor-fuel volatility.

The A.S.T.M. revised its tentative



***REFINERY DERRICK.**—How a standard oil-field derrick will be utilized for supporting the catalyst section of a new "packaged" catalytic cracking unit is shown in this scale model. Designed for nominal feed rates of 3,000 to 6,000 bbl. daily, the units (TCC process) have been engineered by Socony-Vacuum Oil Co., Inc., and will be prefabricated at the Los Angeles plant of Southwestern Engineering Co. Crews of the latter company will then assemble the units at the refinery site. Incorporated in the 195-ft. derrick will be the TCC reactor, regenerating kiln, lift pipe and pot, catalyst-air separator, and catalyst cooler and storage vessel. The remainder of the plant, consisting of feed-preparation section and stabilization equipment, will be grouped around the derrick as shown. During the erection of the plant, the derrick will serve as a construction rig for raising refinery vessels. By "mass-producing" and writing off engineering and design costs over several plants, SWECO expects to reduce costs by one-fifth below those of a similar plant built by conventional methods. Or, independent refiners whose operations require only a small or moderate-size catalytic cracking unit will be able to secure such at a cost, per barrel of feed capacity, very much in line with units of considerably larger capacity. Because the units will be standardized in design, as well as shop fabricated, SWECO expects to complete plants within 6 to 8 months after contracts are let. (For other data, see The Oil and Gas Journal, June 22, page 158.)*

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gasoline specification D-429-49T to provide that the vapor pressure "shall be 15 psi. in Sections 1 and 2 except in March and November in Section 2."

What it means.—This means that motor-fuel Reid vapor pressure may be raised 1.5 psi. in all northern states during December, January and February.

States in this category include Virginia, Kentucky, Missouri, Kansas, Colorado, Utah, and Nevada, and all states lying to the north.

In addition, the 15-psi. maximum applies to 12 of the northern tier of states, from Idaho eastward, for November and March as well.

The new specification carries the qualification that lower maximum vapor pressures may be required for operations at high altitudes or where abnormally high fuel-system temperatures are encountered, as in some heavy-duty equipment and in some heavy-duty operations.

A year ago, Committee D-2 on Petroleum Products and Lubricants considered the raising of vapor pressure maximum, and after due consideration recommended the revision which was accepted by the society.

The new ruling opens the way for a substantial increase in allowable blending of light products in motor fuel for major northern markets during winter months. With the qualifications presently in effect, further volatility revisions are considered as possible in the future, although no additional action by the society is anticipated for some time to come.

Measurement standards.—A long-range project undertaken by Committee D-2's Division II on Measurement and Sampling will bear first results in the near future with the publication of the first of a three-volume work on "Oil Measurement Standards."

The first volume, "A.S.T.M. Manual on Measuring and Sampling Petroleum and Its Products" has been accepted by the administrative committee and will be published probably this summer. This first work will include new tentative methods of gaging, sampling, temperature measurement and volume calculations and corrections.

In cooperation with the British Institute of Petroleum Division II is preparing a complete set of Standard Oil Measurement Tables. These will include additional current products and will bring up to date the tables published in 1936 by the National Bureau of Standards as Circular C-410.

Committee D-2 elected as chairman O. L. Maag of Timken Roller Bearing Co. who was acting chairman since September. L. C. Beard, Jr., of Socony-Vacuum Oil Co., Inc., and W. T. Gunn, American Petroleum Institute, were reelected second vice president and secretary, respectively, and H. M. Smith, of the Bureau of Mines, was elected first vice president.

Imports Decline

Drop of 64,000 bbl. daily from April shown in May

TOTAL imports into continental United States for May averaged 773,000 bbl. daily, a decrease of 64,000 bbl. daily from the April average but an increase of 193,000 bbl. daily or 33.3 per cent over May of last year.

The decrease from April included reductions in imports of both crude and products. Crude was down 14,000 bbl. daily while product imports, mostly residual fuel, were off 50,000 bbl. daily from April.

Mexico and Colombia had a little larger share of crude imports for the month, but total receipts from Venezuela and Middle East were less in the 31-day month than in April.

About 98.3 per cent of total crude imports went to refineries on the East Coast. The remaining 1.7 per cent represented Gulf Coast imports.

Exports from continental United States, excluding shipments to territorries, averaged 261,000 bbl. daily compared with 282,000 bbl. daily in April and 332,000 bbl. daily in May 1949. The big decrease from last year was due principally to the drop in gasoline exports from a total of 3,664,000 bbl. in May 1949 to 1,844,000 bbl. this year.

IMPORTS INTO CONTINENTAL UNITED STATES
(Thousands of barrels)

	May 1950	April 1950	May 1949
Crude—			
Mexico	912	517	739
Colombia	1,646	1,028	711
Venezuela	7,928	8,578	8,312
Kuwait	2,226	2,447	2,059
Saudi Arabia	1,126	1,217	1,074
Total crude	13,838	13,787	12,895
Daily average	446	460	416
Products—			
Residual fuel	9,342	10,417	4,860
Other products	793	899	214
Total products	10,135	11,316	5,074
Daily average	327	377	164
Total all oils	23,973	25,103	17,969
Daily average	773	837	580

EXPORTS*
(Thousands of barrels)

	May 1950	April 1950	May 1949
Crude	2,946	2,969	2,872
Gasoline	1,844	1,911	3,664
Distillate	691	844	690
Lube oils	1,160	1,256	1,305
Other products	1,444	1,492	1,766
Total all oils	8,085	8,472	10,297
Daily average	261	282	332

*Excludes shipments to territories.

EASTERN

Government Gas

Massachusetts bill would put state in fuel business

NEW YORK. — The possibility of state competition in the natural-gas transmission business has been raised by action in the Massachusetts legislature.

The legislature has involved itself in the situation in view of the prospective entrance of natural gas into the fuel markets of New England. One bill is designed to force divorcement of transmission from distribution. Another would set up a three-man natural-gas authority with power to build transmission lines.

The committee on state administration has approved the bill for the natural-gas authority. Members would be appointed by the governor. It could issue up to $25,000,000 in bonds to carry out its program.

Shot at Algonquin.—The divorcement measure, reported out of committee and then tabled, would prohibit any distributing gas utilities from holding stock in or exercising control over gas transmission. This controversial proposal based on antimonopoly grounds appears to be aimed at Algonquin Gas Transmission Co., one of the companies now striving for a Federal Power Commission certificate to enter New England.

Algonquin is owned by Eastern Gas & Fuel Associates and two other utilities, in Boston and in Providence, all of which are affiliated with The Koppers Co. It proposes to take its gas supply from Texas Eastern Transmission Co.

Northeastern Gas Transmission Co., the other contender for the New England license, presumably would not be affected. This company is a subsidiary of Tennessee Gas Transmission Co. and proposes to draw gas from Tennessee as well as from Transcontinental Gas Pipe Line Corp.

The proposal for state construction of gas transmission lines is a novel development in the gas industry. It is complicated by the fact that interstate transmission is closely regulated by the Federal Power Commission. Reports from Boston last week said that Massachusetts had asked the FPC to hold up authorization of gas service into the state until the legislature has acted.

State wants gas. — One source, who doubted that the bill will win final approval, said that it does not appear to prohibit construction by private interests, despite the state authority. Although this type of legislation is discouraging to private capital, Massachusetts is apparently not seeking to block movement of gas into its territory.

While the entrance of natural gas in New England markets has ben denounced by certain fuel-oil marketing interests, the Massachusetts legislature is considering a resolution calling on the federal Government for assistance in bringing natural gas into the state.

Another bill which has passed the legislature authorizes the state Department of Public Utilities to acquire rights-of-way for gas-transmission projects. Existing federal legislation already provides for this.

Pennsylvania Sale

Cities Service Oil Co. (Pa.) has sold to Quaker State Oil Refining Corp. all of its western Pennsylvania petroleum properties except its distribution and marketing facilities.

The sale includes production and gathering systems in Venango, Warren, and Forest counties, and the 3,000-bbl. refinery at Titusville, which is capable of producing 750 bbl. of lubricating oils daily.

H. E. Brandli, vice president and general manager of Cities Service, said the sale "follows logically the recent completion of the new Cit-Con lubricating-oil refinery at Lake Charles, La."

The Cit-Con plant supplies Cities Service with 4,000 bbl. daily of solvent-refined lubricants and makes unnecessary the company's operation of the Titusville plant.

The purchase gives Quaker State its fifth refinery and brings its total crude capacity to 14,300 bbl. daily and its finished-lubricants capacity to 5,945 bbl. daily.

Gas Line Crosses Hudson

Laying of the first natural-gas pipe line ever to cross the Hudson River in New York was begun last week.

The line is a part of a new $2,000,000 extension being built by Central Hudson Gas & Electric Corp. to bring natural gas from the Colombia Gas System at Tuxedo, N. Y., to Poughkeepsie, N. Y.

The Hudson crossing will be made from Highland, N. Y., on the west bank, to Poughkeepsie. The company serves customers through a 2,500-sq. mile area of the mid-Hudson Valley, and natural gas is expected to be delivered later in the summer.

The Highland-Poughkeepsie crossing of Central Hudson will be followed in late July by another crossing of the river by Transcontinental Gas Pipe Line Corp. This line will extend from Edgewater, N. J., to 134th Street in New York City, and is a part of Transcontinental's 30-in. Texas-New York project.

Manufactured-gas lines already cross the Hudson but the Central Hudson company has the distinction of being the first with natural gas. Two 8-in. lines will be laid 2,600 ft. from shore to shore with the river bottom 65 ft. below the surface. The river crossing was expected to be finished in 4 or 5 days.

SOUTHWEST

Imports Truce

TIPRO calls off attack until end of emergency

AUSTIN.—The Texas Independent Producers and Royalty Owners this week temporarily called off its fight to curtail imports of foreign oil.

In a letter dated July 13 and addressed to the major importing companies, TIPRO President R. L. Foree cited the Korean crisis as an emergency possibly requiring complete oil-industry mobilization.

Foree made it clear, however, that the association's efforts to restrict imports will be resumed on a full scale as soon as the war crisis has subsided.

In his letter Foree said, "With the critical problem of limiting oil imports yet unsolved, we find ourselves suddenly confronted with the threat of another all-out war.

"Momentarily now the American oil industry may be called upon to do a job that will dwarf its record performance of the last war. Such an effort will require the mobilization of the entire resources and the full cooperation of every individual and company participating in the production, transportation, refining, and marketing of petroleum and its products. . . .

"Under existing conditions, dissension within the industry that might impair the effectiveness of the overall program cannot be tolerated. In the national interest the differences between the independent producers and importing companies must be shelved for the duration of the emergency.

"In doing so, however, we make no concessions in principle. . . ."

Scurry Plant

35 operators plan big gas-conservation project

TULSA.—Thirty-five operators and casing-head gas owners will build the largest gas-conservation project yet announced for the Scurry County, Texas, area, and Sunray Oil Corp. will be operator of the gasoline plant, which will process approximately 67,000,000 cu. ft. of gas daily.

Sunray announced here that work will start within the next 3 months and that the plant should be in operation by next spring. Its producing capacity will be in excess of 450,000 gal. daily of L.P.G., including propane, butane, natural gasoline, and other allied products.

Approximately 35,000 producing acres in the North Snyder, Kelley-Canyon, and Diamond "M" fields are involved in the construction and operating contracts covering development of the project. H. W. Manley, recently named manager of Sunray's gas and gasoline department, will have general supervision of the enterprise. He formerly headed these activities for Barnsdall Oil Co., which was absorbed by Sunray.

L. G. Rogers, superintendent of Sunray's manufacturing-operations section, will serve as superintendent of the construction project, and E. J. Mills, formerly superintendent of Barnsdall's Benton, La., gasoline plant, will be field-project superintendent.

High liquid content.—The liquid hydrocarbon content of gas in the Scurry area is unusually high, and engineering analyses indicate that the new gasoline plant will extract between 7 and 8 gal. of liquid products per M.c.f.

Sunray, as the operator, is now in the process of installing high-pressure gas-gathering lines.

The plant will be located on the Von Roeder farm, in Tract 20, Section 40, of Kirkland & Fields Survey.

NEXT WEEK

Canadian Gulf at Stettler.—Drilling, completion, reservoir data for this large development of Canadian Gulf Oil Co. in Alberta, are presented by P. C. Ingalls, Journal associate editor.

Largest cooperative gas-injection project.—That is in North Cowden field, West Texas; article by N. H. Rahmes, Stanolind Oil & Gas Co. (operator), describes design and construction details of the natural gasoline-compressor plant especially installed.

Spent caustic in refineries?—Kenneth M. Brown, Universal Oil Products Co., and Soma Kurtis, Aurora Gasoline Co., describe new method of utilizing spent caustic solutions with flue gas, discuss operational unit at Aurora's refinery.

Drilling-mud system.—Account of installation by Fred M. Manning, Inc., which incorporates a number of interesting engineering features.

Deep Rock water flood.—Project in Allen County, Kansas, covers 304 acres; oil recovery estimated 3,500 to 6,950 bbl. per acre.

XUM

Tax-Bill Objection

Oil industry representatives protest provisions written by House committee, see drop in leasing, exploration

WASHINGTON. — Three major oil associations warned the Senate finance committee this week that a new formula for capital gains and losses written into the tax-revision bill by the House ways and means committee will lead to immediate and drastic curtailment in leasing and exploratory activities unless amended to permit the oil and gas industries to deduct abandonment losses from taxable income, as at present.

Under the House bill, Section 209 (D) of the Internal Revenue Code would be amended to provide that the abandonment of a capital asset or of property used in trade or business would be considered as a sale or exchange, and Section 117 (J) would be revised to reclassify losses on the sale of property used in the trade or business as capital losses. Under the present law losses incurred in the abandonment of oil or gas properties can be offset against income.

A.P.I. objects.—In a statement filed with the committee, James J. Cosgrove, chairman of the board of Continental Oil Co., Ponca City, Okla., declared the American Petroleum Institute sees a threat in these provisions to operations in both onshore and offshore areas, the latter particularly because of the tremendous expenses involved in Continental Shelf development off Texas and Louisiana.

Cosgrove asserted that the Internal Revenue Bureau has been chipping at the oil industry for years, pointing out that after permitting operators for over 20 years to treat exploration costs as current expenses, it required a portion of such costs to be capitalized in 1942 and last April ruled that all geological and geophysical expenditures must be capitalized against properties retained or acquired, with operators recovering their investment through depletion if they are productive or through abandonment losses in the year in which worthlessness is established. The proposed formula would be the final blow, he said.

If the proposed changes should become law, Cosgrove said, "many oil industry members would no doubt be forced to consider the advisability of selling their properties in order to realize capital gains against which to offset their losses, since abandonment losses are inevitable in the exploration and development of new sources of oil. This could only mean that eventually they would go out of business.

"Those who would buy, or remain and continue to explore and drill for new oil sources, would tend to limit their prospecting only to those leads which had a better than even chance of success. In these threatening times when every drop of domestic oil supply may suddenly be needed, this is a condition which we believe Congress would be the last to intentionally invite."

I.P.A.A. protests.—More than 12 times as much nonproductive land as productive land is under lease at the present time, 200,000,000 acres against 16,000,000, and development in this area would be immediately threatened, it was asserted by Russell B. Brown, general counsel for the Independent Petroleum Association of America.

The practical effect of the proposed changes in tax law would be curtailment of activities, resulting in fewer new fields found, less reserves of oil, and less productive capacity.

Capital gains in this area of the oil industry are few, it was brought out, but large recurring losses are the normal essential result of exploratory activity. Between 40,000,000 and 50,000,000 acres under lease are surrendered or abandoned each year at a loss to the operators, almost 9 out of 10 wildcat wells are unsuccessful, Brown testified, but these are "normal and necessary" factors which in the past have been recognized in the tax laws.

M.C.O.G.A. represented.—Possibilities that the amendments might result in the payment of taxes on income that did not, in fact, exist were pointed out by Guy H. Woodward, attorney for the Mid-Continent Oil and Gas Association, who explained that a corporation having $1,000,000 net income from other properties might abandon a lease after spending that much in exploration and drilling and unless it could charge the loss off against income might have to pay as much as $410,000 taxes on income which actually it did not enjoy.

Woodward warned that if these amendments are left in the bill the country might well become dependent upon foreign oil, while the Government will lose tax revenues by reducing oil industry employment and closing the door to venture capital.

Testifying at the opening of the hearings, Treasury Secretary John Snyder renewed his attack on the percentage depletion allowance, but committee members said it was very unlikely that this issue, killed by the House, would be revived.

Snyder's statement. — In discussing percentage depletion, Snyder took the position that it has been pushed far beyond the boundaries contemplated by Congress when it originally adopted the deduction and is resulting in "the development of a system of concessions which is not only incongruous in a sound and equitable tax system but which is also ill-suited for a sound national policy of mineral development and conservation."

Snyder was particularly critical of extension of depletion allowances to sand on the seashore and gravel on the hillsides, but he took time out to air his views on the allowance for oil.

"Taxpayers in the favored industries, and particularly a few large corporations, benefit at the expense of the rest of the business community," Snyder told the Senate committee.

"The advantage is defended on the grounds of special risks in the oil industry which, incidentally, is regarded as a favored investment by conservative investment trusts. A business man desiring to invest in a new product might incur greater risk, but is limited in determining his taxes to the recovery of his actual investment costs over the life of the property. The allowance for tax purposes of deductions many times the investment that may be made in oil properties means that many other types of businesses are now paying more taxes than they should in order to enable the government to recoup the tax leakage from percentage depletion."

OGD's Future

Congress places division directly under Chapman

WASHINGTON.—Future of the Oil and Gas Division appeared this week to be up to Interior Secretary Oscar L. Chapman following approval by the Senate appropriations committee of House action transferring the OGD to the secretary's office.

In passing the omnibus appropriation bill for the current fiscal year the House authorized employment of a director of the Oil and Gas Division but left it up to the secretary to decide how much of a staff the director would have.

The Senate committee approved that action but cut the secretary's fund to $215,000 under the House figure. This would give him $2,100,000 as compared with a budget estimate of $2,345,000 but would still be

in excess of the $1,918,875 he had last year.

Members of the committee explained that the cut was aimed at certain programming activities Chapman proposed to set up and expressed the view that the OGD would be taken care of in the distribution of the lump sum allowed for the activities of his office.

The Senate committee, however, specifically cut $20,000 from the $200,000 allowed by the House for enforcement of the Connally Act. It went along with the House, however, on other appropriations relating to the oil activities of the department, which will give the Bureau of Mines $1,117,827 for work on petroleum and natural gas, $8,281,400 for synthetic liquid fuels and $95,050 for helium. The Geological Survey will get $850,000 for supervision of mining and oil and gas leases and $4,445,000 for geologic and mineral resource surveys and mapping.

The committee also approved the provision of $11,000,000 for Navy operations in Alaskan Reserve No. 4 and $4,000,000 for operation and conservation of the naval petroleum reserves made by the House, but raised the appropriation for the Federal Power Commission by $75,000, to $4,013,300, to provide for expanded activities due to an increase in natural-gas work and particularly a need for additional legal services.

Residual Under Fire

Neely report expected to demand definite restrictions on imports despite war threat; N.C.A. pushing for controls

WASHINGTON.—With Sen. Matthew M. Neely of West Virginia due to report by July 15 on the results of his investigation of the effect of oil imports on the domestic coal, oil, and railroad industries, pressure for governmental curbs on residual fuel oil, at least, have been stepped up.

During the course of hearings last month, Neely indicated that his report, originally slated for submission to the Senate by June 25, would call for definite restrictions on imports which he said were crippling the coal industry and the railroads, as well as adversely affecting domestic oil producers and independent refiners.

Despite recent developments such as cancellation of the Mexican reciprocal trade agreement, the invasion of South Korea and increased domestic demand, which in some quarters was expected to take the heat off the drive against imports, Neely is expected to hold fast to his original belief that either the President or Congress should act in behalf of the domestic interests.

That view is supported by recent statements from leaders in the coal industry whose cause is being espoused by Neely, who represents a major coal-producing state, that the Korean situation makes a curb on oil imports more necessary than ever in order that the coal industry may be in a position to meet the needs of a national emergency, if one develops.

NCA active.—This theme was stressed last week in a bulletin from the National Coal Association reporting that Rep. Harry J. Davenport of Pennsylvania had informed Neely that oil imports for the first 4 months of 1950 were 40 per cent above those of the same period in 1949, while exports declined by 22.8 per cent.

"As the fate of the world hangs in the balance between war and peace," the NCA commented, "we call attention to the fact that with battle fleets and planes maneuvering and assembling at strategic points throughout the world, they will of necessity require an enormous quantity of oil and its products.

"We do not know whether the present emergency will require all the available oil, but we do know that the coal industry is again prepared to furnish the fuel and power for the nation as required."

The outbreak of hostilities in Korea makes the need for government action to restrict oil imports "incalculably more acute," Davenport said, adding that whether or not that explosion in Korea produces the necessary action "it is still incumbent upon us to take steps to alleviate the hardship that foreign oil has brought to this country."

IPAA cites examples.—Emphasizing the effect of residual fuel imports on the domestic oil industry, the Independent Petroleum Association of America issued a report last week showing that between 1948 and the first quarter of 1950 the daily crude production in six heavy-crude-oil fields declined 48 per cent while the average price per barrel fell 19 per cent, reducing the daily average income of producers in those fields by 58 per cent.

The fields cited by the I.P.A.A. were Hawkins and Talco in Texas, Baxterville and East Heidelberg in Mississippi, Oregon Basin in Wyoming, and Kern River in California.

The experience in these fields, declared typical of the 283 fields throughout the country that accounted for more than 600,000 bbl. daily, or 11 per cent, of the total 1948 crude production, has taken place, the association said, "while residual fuel imports, the principal product made from these crudes, have increased steadily.

"No claim is made that imports were the sole cause of this injury," the I.P.A.A. statement continued. "It is equally ridiculous to contend, as the importers have, that imports had no effect on these producers."

The I.P.A.A. estimated that because of the restricted market and depressed price, domestic refiners lost $500,000,000 from 1948 to 1949 in the sale of residual fuel oil, which have increased their hold on the market from 20 to approximately 36 per cent.

"This means that one out of every three consumers of residual fuel oil along the East and Gulf coasts is dependent for continuing operations upon a source of supply outside the borders and beyond the control of this nation," it declared. "This becomes of particular significance when it is realized that these consumers represent mainly basic manufacturing and utility concerns which are essential to the nation's security."

Further, the association charged, the residual imports are controlled almost entirely by two concerns.

Synthetics Plea

Chapman asks extension of 3 years, $25,000,000

WASHINGTON.—A 3-year extension of the Bureau of Mines program for development of synthetic fuels and appropriation of an additional $25,000,000 is being sought by Rep. J. Hardin Peterson of Florida, chairman of the House public-lands committee.

The present program, for which $60,000,000 was provided, will expire in 1952 and bureau officials are confident that within the life of the extended project they will be able to get production costs of synthetic fuels on a competitive basis with petroleum.

While recent estimates of the bureau indicate that synthetic liquid fuels can be made from oil shale and coal at costs almost approximating those of petroleum products, there has been some question whether the government figures are accurate and all-comprehensive. A National Petroleum Council committee is now making a study of them.

While costs have been brought down to a point where it is claimed they are almost on a competitive basis with petroleum, that "almost" is the toughest gap to close.

The legislation, which will not be acted upon until next year, was requested by Interior Secretary Oscar L. Chapman.

Chapman laid his request for additional time and funds before Peterson with the explanation that contin-

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uation of the program will benefit the nation "by forestalling or alleviating any oil shortage that may result from either inadequate domestic petroleum production or interruption of supplies from overseas.

"It also will lower the cost of producing synthetics so that the American public may be assured ample quantities of oil at reasonable prices for centuries," he added. "As a final result of this program, this nation should be in a position to attain self-sufficiency in oil if the need should arise."

Relating the progress made thus far, which he termed "significant," the secretary said that "appraised in terms of product cost, a primary factor considered by private industry in making new investments, these research and development achievements mean that refined products now could be produced from oil shale and coal at estimated actual costs averaging 7.3 and 10.8 cents a gallon, respectively.

"It should be understood that these costs do not include return on investment," he explained. "Even so, they are approaching the actual cost levels of similar products from petroleum. Further reductions are certain as our technical knowledge is extended, permitting process improvements."

Rubber Stepup

Synthetic output increased by 88,000 tons per year

AN 88,000-ton increase in the Government's annual synthetic-rubber production was put under way this week by the Reconstruction Finance Corp.

Arrangements are being made for reactivation of the GR-S plant at Port Neches, Tex., with an annual capacity of 75,000 tons, and the butadiene plant at Houston formerly operated by Sinclair Rubber, Inc. A third plant, at Baton Rouge, La., formerly operated by Esso Standard Oil Co., will be reactivated for the production of approximately 13,000 tons of butyl rubber.

Expansion of synthetic-rubber production was under consideration even before the Korean crisis, partly as a result of pressure from the domestic-rubber industry for action to force down the inflated price of natural rubber, which is about 75 per cent higher than the price set for government-produced synthetic, and partly as a means of increasing rubber supply as a safeguard against interruption of production in the Far East.

Domestic consumption this year is now estimated at something slightly in excess of 1,000,000 tons and an increase in synthetic output would free natural rubber for stockpiling almost to the extent of the additional production of the government plants.

With the new facilities there will be a total of 18 government plants in operation and 9 in standby. The operating facilities will have a capacity of approximately 500,000 tons of general purpose and 75,000 tons of butyl rubber annually.

Nine representatives of the rubber manufacturing industry went to the White House last week to lay a program for synthetic expansion before Dr. John R. Steelman, presidential aide.

Their program called for the opening of additional copolymer facilities and an increase of 10,000 tons a month in GR-S production, now around 30,000 tons monthly, with the Government prepared to increase output to 50,000 tons a month by the end of the year.

It was also recommended that the RFC be authorized to build and maintain a substantial inventory of GR-S over and above the normal commercial inventories carried by industry and the Rubber Reserve, and that all available standby capacity for butyl production be reactivated immediately.

ERP Review

Program half over; cost for oil stands at $888,500,000

WASHINGTON.—The first half of the European Recovery Program has cost the United States $888,500,000 for provision of petroleum and petroleum products for the Marshall plan countries.

That figure represents the authorization approved between April 3, 1948, when the program got under way, and April 30, 1950, the first 25 months of the effort to get the European economy on its feet by June 30, 1952.

Latest figures of the Economic Cooperation Administration show that European oil procurement is switching from the United States to other areas, as contemplated in the over-all design for making the Marshall plan countries less dependent upon the United States for supplies of commodities that can be developed in non-dollar areas.

Where it came from.—During the first year of the program, authorizations for oil and products totaled $471,400,000 of which $166,400,000 was for procurement in the United States. For the following 13 months, authorizations totaled $417,100,000 of which only $103,200,000 was for procurement in this country. Meanwhile, authorizations for procurement in nonparticipating countries, almost exclusively the Middle East, increased from $131,400,000 for the first year to $172,200,000 for the next 13 months.

For the 25-month period, authorizations included $269,700,000 from the United States, $302,700,000 from the Middle East, $94,700,000 from Latin America, and $220,300,000 from participating countries, the last two being the estimated distribution between Latin American and participating countries based on the actual source of shipments. This would throw the Dutch West Indies, for instance, into the column for participating countries instead of Latin America where it was first carried.

The $94,700,000 from Latin America, under the ECA method of allocation, would represent procurement in Venezuela. Procurement in the Netherlands West Indies would represent approximately $215,000,000 of the $220,300,000 assigned to participating countries.

Where it went.—The distribution by recipients of the $888,500,000 granted for oil and products was reported by the ECA as follows: United Kingdom, $262,800,000; France, $280,900,000; Italy, $75,100,000; Germany, $20,700,000; Netherlands, $49,800,000; Belgium-Luxembourg, $50,000,000; Austria, $3,000,000; Greece, $18,900,000; Denmark, $40,100,000; Norway, $21,900,000; Ireland, $10,800,000; Sweden, $42,800,000; Turkey, $2,400,000; Trieste, $6,000,000; Portugal, $2,200,000, and Iceland $1,000,000.

The $269,700,000 for procurement in the United States included $70,000,000 to France, $103,000,000 to the United Kingdom, $20,600,000 to Italy, $5,200,000 to Germany, $16,300,000 to the Netherlands, $14,300,000 to Belgium-Luxembourg, $2,600,000 to Austria, $4,000,000 to Greece, $5,800,000 to Norway, $14,800,000 to Denmark, $1,100,000 to Ireland, $110,000 to Turkey, $10,500,000 to Sweden, $137,000 to Trieste, $480,000 to Portugal, and $553,000 to Iceland.

Authorizations in the Middle East oil area, which includes Saudi Arabia, Iran, Iraq, Bahrein, Kuwait, and Israel, included $37,693,000 to the United Kingdom, $152,781,000 to France, $43,525,000 to Italy, $10,370,000 to Germany, $17,132,000 to the Netherlands, $12,463,000 to Belgium-Luxembourg, $9,829,000 to Greece, $721,000 to Denmark, $1,172,000 to Ireland, $8,368,000 to Sweden, $2,250,000 to Turkey, $4,740,000 to Trieste, and $1,700,000 to Portugal.

Shipping Restrictions Asked

WASHINGTON. — Legislation designed to impose strict restrictions on the lease, charter, or sale of American vessels for operation under foreign flags has been introduced in Congress by Sen. Warren G. Magnuson of Washington.

Under the bill, leases and charters for more than 1 year or sales of vessels to aliens or transfers to foreign registry could be made only with the approval of the Secretary of Commerce.

The secretary, in turn, could give his approval only if the Secretary of

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WATCHING WASHINGTON

Bertram F. Linz

New Smells for Fuel

If you like the odor of well-aged Scotch or your wife likes Chanel No. 5—which she probably does—you may be able to call your coal dealer up one of these days and order it by the ton.

For coal is going class conscious, and where today the consumer has a choice of only two odors, coal or oil, soon he may be able to scent his home to match his mood.

It's all part of the industry's drive to make coal the preferred fuel. For years, coal smelled just like coal, then dealers began to treat it with oil for dust proofing and it smelled different but no better. Now the industry is seeking something to add to the oil so that treated coal will have a pleasant scent.

It may be a good idea and if the coal people make a go of it the oil industry probably won't be far behind in bringing out gasoline and home heating oil to titillate the senses. Or maybe even diesel oil that smells civilized.

Fill 'er up with verbena ethyl, buddy.

War and the Industry

President Truman's decision to build the armed forces up toward authorized strength will mean a general, but initially slight, tightening up all along the line.

As more men go into service more workers will be required to produce military needs. As more military equipment is brought into use and more ships are put into service more oil will be required to fuel them.

The Defense Department is far behind on its procurement of equipment. Large contracts for trucks and vehicles recently awarded were expected by the manufacturers as much as 6 months ago and have no relation whatever to the Korean war.

Military officials apparently believe that present supplies of equipment and material, including oil products, are adequate for the first phase at least of operations in the Far East, but it is expected they will have to go into the market in a big way if the fight in Korea proves long drawn out.

So far, there is no indication in Washington that the situation has had any decided effect on oil imports. The importing companies have not indicated that they will either increase or reduce their shipments to the United States, but some officials believe they will continue at about present levels in an effort to build up inventories against a sudden emergency.

The authorized strength of the armed forces is something in excess of 2,000,000, some 600,000 more than are now in service. For reasons of economy, the Defense Department has been holding its expenditures to a minimum which now must be disregarded to support both increased forces and expanded operations.

No Adjournment

Administration leaders are seeking to get Congress out of Washington by August 1, apparently believing that such action will give the country a measure of confidence that a third world war is not necessarily imminent.

It is not believed, however, that Congress will adjourn, which would make it necessary for the President to call a special session if he had to get it back in a hurry, but rather will recess subject to recall by House and Senate leaders.

To end the session within the next 3 or 4 weeks, congressional leaders are preparing to jettison all but the few most important of the many bills now pending, including a number of the President's original must list.

The administration view is that if the congressional session is prolonged business might become jittery and start to slow down, which would make things tough from the standpoint of tax revenues and unemployment and curtail production which would be vital in the event an emergency did develop.

On the other hand, it is already becoming difficult to keep members in Washington who want to be out home fence-building against the November elections, and as men slip out of town in increasing numbers to do a little campaigning it could well develop holes in the administration's defense through which opposition might drive undesirable legislation.

Equally important is the belief in the administration that it won't be able to get any emergency legislation until Congress wants to give it, and that point will be reached only when public opinion demands it.

So far, public demand for the adoption of emergency measures has not been very substantial but within the next few weeks it is probable administration spokesmen will be out in the field attempting to stimulate it.

Defense certified that retention of the vessel is not of essential military or defense value, the Secretary of State certifies the transfer is in furtherance of the foreign policy of the United States, and the Federal Maritime Board, after public hearing, determines the vessel is not necessary to the promotion and maintenance of an adequate merchant marine, is not to be operated in competition with American flag ships in the foreign commerce of the United States, and will be operated under manning scales, crew accommodations, and safety provisions "in accordance with the highest international standards."

War Preparation

Export controls tightened; materials diversion seen

WASHINGTON.—First steps toward tightening the economy as a result of the Korean situation were taken last week by the Department of Commerce in reducing from $1,000 to $25 the maximum value of unlicensed exports of petroleum fuels.

At the same time the State Department requested oil companies to cease all shipments to the Far East as a guard against seizure by the North Koreans and asked the British and Dutch governments to take similar action, unsuccessfully in the case of Britain. (See International.)

The Department of Commerce order provided that a validated export license will be required for all shipments valued at more than $25 of aviation, automotive and other motor fuels and gasoline, kerosine, gas oil and distillate fuel oil destined for any country except Canada, to which export controls do not apply, or Mexico, to which the former $1,000 limit will be continued.

Previously, the department suspended all export licenses for shipment of anything to North Korea and was reported preparing for quick extension of controls in the event the Korean war runs into an extensive military operation.

Administration officials foresaw a sharp increase in military fuel requirements as a result of our intervention in Korea, which is calling for considerable air and naval activity and will involve an "air lift" to move in supplies.

Diversion expected.—Meanwhile, with domestic demand for many commodities, particularly steel, well above peak war requirements while demand for others, including oil, is close to the wartime high, observers in Washington saw some diversion of materials from civilian to military production inevitable if any extensive military operations develop in Korea. In only a few instances, an outstanding one of which is oil, could

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output be expanded quickly with present facilities.

If the necessity for such diversion develops, the Government has two authorities to use in the situation. One is the Export Control Act, under which it would be possible to reimpose the export quota system used during the last war and, by limiting shipments abroad, add to the supply available for military use without curbing domestic civilian consumption by rationing or other action.

Tighter controls.—Under the other authority, provided in the recently extended draft law, manufacturers holding military orders can be required to give them priority over all others. Under that act the President, upon appropriation recommendation, can require manufacturers to set up such priorities.

The action of the Commerce Department in reducing the maximum unlicensed oil exports will not, of itself, serve to reduce shipments abroad, but will give the Government more complete control over the destinations to which they may go. If necessary, this order could be supplemented by the imposition of exports on oil, pipe and other commodities, bolstering the domestic and military supply, but this step will not be taken by the administration unless it becomes evident that otherwise domestic consumption will have to be curtailed.

Industry Ready

Hallanan tells Chapman oil is prepared for emergency

WASHINGTON. — The domestic oil industry is ready and waiting for any emergency that may arise, Interior Secretary Oscar L. Chapman was assured last week by Walter S. Hallanan, chairman of the National Petroleum Council.

In a letter to the secretary, Hallanan said that "in this hour of grave uncertainty, I feel that you and your associates in government and the men of the oil industry can unite in a high degree of pardonable pride in the realization that our joint efforts have been productive of a condition that gives a feeling of assurance to the American people."

The council is scheduled to meet in Washington July 25, by which time it is expected there will be some clarification of the situation in Korea on which such suggestions as may be felt necessary can be made to the industry by the Government through the NPC.

"The petroleum industry is ready to contribute its full share in meeting any emergency which may come to America's door," Hallanan wrote. "It has the reserves, the productive facilities, the trained personnel and the technological 'know-how' to produce and deliver the most vital essential of national security, just as it did in two previous world wars.

"More than that, the industry has a detailed plan under which it can turn overnight all of its facilities to the national defense. The development of this farseeing program has been due very largely to the cooperative effort between the industry and the Government, as carried on by the National Petroleum Council and the Oil and Gas Division of the Department of the Interior with the full cooperation of the Department of Defense."

Hallanan did not refer specifically to congressional proposals to eliminate the Oil and Gas Division as an independent entity of the interior department, but he did express to Chapman his certainty that "granted the conditions of a free economy and continued recognition of the economic laws which direct its operation together with continued government-industry cooperation, the petroleum industry can and will meet its responsibilities at home and abroad and contribute its full share in meeting the threat to world peace.

"I know that your first concern at the moment—the first concern of all government officials and of the American people—is the serious menace of another world war provoked by a ruthless aggressor nation," Hallanan concluded. "At such a time, it wanted to give you and, through you, the President and the Secretary of Defense, fresh assurance that the oil industry is ready to meet any call which may come from our Government."

WEST COAST

Production Gain

California operators open up some shut-in producers

LOS ANGELES.—Responding almost immediately to the price advance for heavy-gravity crude, California's crude-oil production last week advanced almost 10,000 bbl. daily—the first substantial increase recorded since the downward trend was started a little over a year ago. Estimated output for the state last week was 883,000 bbl. daily as compared with 873,500 bbl. in the previous week.

Some 3,000 bbl. of the added production resulted from opening of shut-in production in the Tonner area in Brea-Olinda field. Most of the remaining increased new production resulted from opening closed-in heavy-oil producers in the Midway and Kern River areas in San Joaquin Valley and the San Ardo City pool of Coastal California.

Current estimates of California's closed-in production place the amount at 100,000 bbl. daily. Most of this production is crude of very low gravity, but some high-gravity oil also is not being produced.

Shortly after the first of the year it was estimated that 3,200 California producers were shut in. In recent weeks a few have been brought back on production, but the great bulk still remain shut in.

The price advance posted by Standard Oil Co. of California, effective June 29, was 15 cents for 14°-gravity oil and decreasing with gravity increase to 1 cent per barrel for oil of 25°-25.9° gravity. Union Oil Co., possibly the largest California heavy-oil buyer, and General Petroleum Corp. also have posted similar higher price schedules.

CANADA

Refinery Supply Line Planned

SARNIA, Ont.—An early start on construction of a $20,000,000 refinery for Sun Oil Co. was seen this week following the announcement that Susquehanna Pipe Line Co. will construct an oil-transmission line from a point south of Toledo to Froomfield, on the Canadian side of the River St. Clair.

Application has been made for authority to lay a line 12 ft. under the river bed between Marysville, Mich., and the Canadian shore.

Some years ago Sun Oil Co. purchased a site of 125 acres south of Sarnia. The terminal of the pipe line will be on acreage held by the Sun company.

New Bonus Record

CALGARY.—The Alberta Government collected another $8,105,690.03 in cash bonuses on June 29 when oil companies and investment groups poured in sealed tenders for Crown Reserve oil and gas leases at Redwater and Woodbend.

Top bids accepted for six Redwater quarter sections totaled $7,536,790.03, while bids for three Woodbend quarters brought top bonuses totaling $568,900. Bids were rejected on two Redwater quarters.

Previous Crown Reserve bonus records tumbled on June 29 when bids were opened for two production-surrounded Redwater quarters believed to have 170 ft. or more of pay zone. One brought a bonus of $11,646 per acre, the other $11,419 per acre. Previous record, set May 11, was $10,073 per acre.

The Redwater and Woodbend sales boosted the Alberta treasury's total Crown Reserve cash bonuses in 2½ years to $46,605,301.44. Of that total, about one-half ($23,872,303.80) has come during the first half of calendar year 1950. Nearly one-third ($14,750,-128.08) has come since the fiscal year started 3 months ago on April 1.

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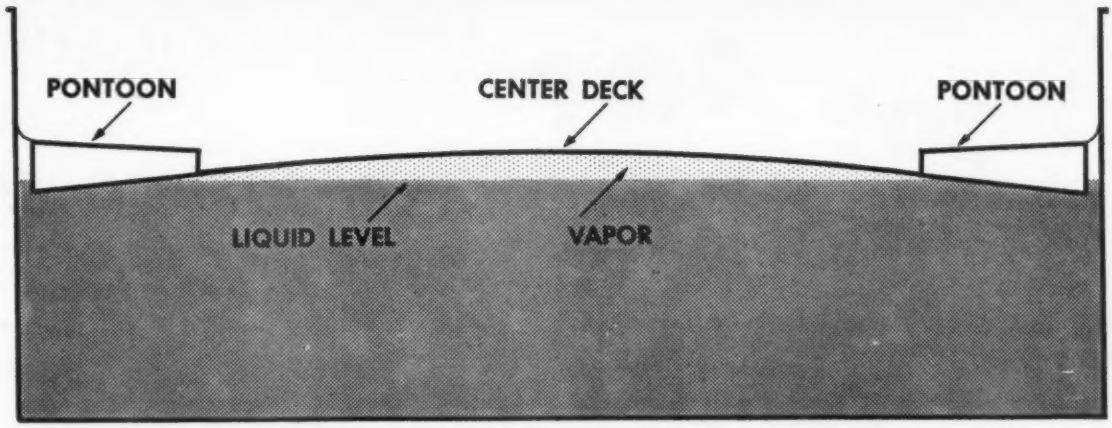

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The above sketch shows how the Horton Pontoon Roof gives you effective protection from evaporation losses due to boiling when it is installed in a flat-bottom tank storing crude oil, gasoline or similar petroleum hydrocarbons. The air space in the pontoon ring around the outer edge of the deck insulates the seal and the liquid under it. If boiling occurs, the vapor is trapped under the center section of the deck which domes upward, forming a blanket of vapor over the surface of the liquid. This serves as an effective insulating medium and prevents further boiling. When the temperature decreases, the vapor trapped under the roof condenses.

Normally the entire bottom of the Horton Pontoon Roof rides directly on the liquid in the tank. The vapor space exists only when boiling occurs.

Protection from evaporation losses caused by boiling is only one benefit provided by the Horton Pontoon Roof. It also cuts down corrosion, reduces the fire hazard, and reduces evaporation losses caused by breathing and filling. Write our nearest office for full details.

We also build the Horton Pan Floating Roof for use on tanks where boiling is not encountered and the Horton Double-Deck Floating Roof, which prevents boiling by insulating the entire area of the tank.

Below: 37,500-bbl. tank equipped with a Horton Pontoon Roof at the Esso Standard Oil Company refinery at Baton Rouge, La. This view shows the pontoon and single deck sections clearly.

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Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 17.....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3.....1615-1700 Walnut Street Bldg.
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MIDDLE EAST

New Deal in Iran

Government's take will jump if parliament approves new agreement with Anglo-Iranian; other countries watching

Dahl M. Duff

DETAILS of the pending agreement revising the concession terms for Anglo-Iranian Oil Co., Ltd., in Iran have been given by Sir William Fraser, chairman, in the company's recently issued annual report.

The agreement, which sharply increases payments by Anglo-Iranian to the Iranian Government, has been closely followed in the industry in view of its possible bearing on other concessions in the Middle East. The Iranian parliament, which adjourned without acting on the agreement last year, is now again considering its ratification.

As a result of the revision, Anglo-Iranian's royalty would be increased from 4 to 6 shillings per ton and the payment in lieu of taxes would be a flat one shilling per ton, both subject to adjustment for fluctuation in the price of gold.

Extras.—The supplemental agreement also provides for an immediate payment to the government of 20 per cent of the company's general reserve at the end of 1947 and similar payments in respect to allocations to general reserve thereafter. These payments, plus those based as previously on the dividend distribution, are subject to a £4,000,000 a year minimum. They would not be subject in the future to the British income tax.

The discount on the basic prices for oil products sold in Iran would be extended under the agreement, according to the outline given in the report. Previously discounts of 25 per cent to the government and 10 per cent to the public were given off Gulf or Romanian prices. The new provision is for discounts in both cases to be at the rate of 25 per cent.

The chairman's remarks on the effect of this agreement shows the greatly increased over-all payments to the Iranian Government. The figures given indicate that the company would pay to Iran a total sum equivalent to slightly over 31 cents a barrel based on its 1949 production.

The agreement would be retroactive to the end of 1947. The payments for the years 1948 and 1949, on the basis of the 1933 agreement, amount in total to £9,172,245 and £13,489,271 respectively. With the agreement ratified, the corresponding payments would be £18,667,786 and £22,890,261.

Over-all report.—The report also gave a summary of information on all phases of the company's activities as one of the leading integrated oil organizations in the Eastern Hemisphere. The chairman reported a decline in the group trading profit from £50,700,804 in 1948 to £38,666,485 last year (The British pound is equivalent to $2.80).

"The decrease in our profits, despite the considerable increase in our total sales . . . reflects the rising tendency of costs and the lower prices of products as compared with the previous year," he said. "During 1949 the growth of total world demand for oil products slackened, a reduction in the expansion rate in the United States more than offsetting an increase in the rest of the world; at the same time, the successful efforts made in 1948 by all sections of the industry to expand supply facilities were becoming increasingly effective."

The following are excerpts from the report giving some of the information of particular interest:

Production and exploration.—Iranian production increased to 26,807,000 tons (about 563,000 bbl. daily) from 24,871,000 tons in 1948. Agha Jari field contributed 11,169,000 tons (about 234,000 bbl. daily) and Haft Kel 9,404,000 tons (about 197,000 bbl. daily). In Lali field, further sources of production have been proved to underlie the present producing area.

In Kuwait, where Anglo-Iranian has a half interest, the 86 wells drilled to the end of the year are sufficient for present requirements and the drilling program is being curtailed. Satisfactory results have been obtained from tests of structures in Southern Iraq, and plans are being made to connect the area by pipe line with a terminal on the Shatt-el-Arab at Fao. Anglo-Iranian holds a 23.75 per cent interest in the Iraq Petroleum Co., Ltd., organization.

Nearly 400 wells with a total footage of nearly 900,000 ft. have been completed in various parts of England and Scotland by Anglo-Iranian since 1936, and recently a new test at Formby was completed without finding oil. While the results to date have been small in terms of oil production, discovery of other mineral resources of national importance have been made, and much valuable geological and scientific data acquired.

Refining. — Anglo-Iranian's Abadan refinery, the world's largest, processed 23,245,000 tons (about 487,000 bbl. daily) in 1949. This was another record total. Steady progress is being made in still further expanding throughput capacity and increasing operational flexibility. The Abadan plant is one of 12 refineries in nine countries operated by Anglo-Iranian and its associated companies.

A new refinery of 1,000,000 tons capacity was completed in Kuwait and commissioned last November. In Italy, the Porto Marghera refinery, in which Anglo-Iranian is associated with Azienda Italiana Petroli, operated satisfactorily, and its expansion is well advanced. Construction of a new Belgian refinery with Petrofina is continuing, and operations should begin next year. In France, Soc. Generale des Huiles de Petrole increased throughput at L'Avera to 1,384,000 tons and placed in operation the first stage of its new plant at Dunkirk.

Arrangements have been completed by Anglo-Iranian for the construction of a new refinery of 2,000,000 tons per year throughput with a full range of products on the Thames Estuary in the Isle of Grain area of Kent. Good progress also was reported in the expansion of the company's existing United Kingdom refineries. Total throughput at Llandarcy was 1,259,000 tons, and work is well forward on the project to expand capacity at Grangemouth to 1,500,000 tons.

British Petroleum Chemicals, Ltd., expects to complete its new petrochemical plant at Grangemouth this year. Anglo-Iranian holds half interest in British Petroleum Chemicals, and the latter company holds two-thirds interest in a new company, Forth Chemicals, Ltd., which will erect a styrene plant near Grangemouth.

Transportation. — The report noted that no further progress has been made regarding a right-of-way agreement for Middle East Pipelines, Ltd., with Iraq, and said that construction work on this project is in abeyance. With the completion of the new 20-22-in. Agha Jari line in Iran, in April, 2,473,000 tons of crude were exported from the port of Mashur during the year. The new loading jetty at Mena al Ahmedi in Kuwait is believed to be the largest of its kind in the world, and a loading rate of more than 3,500 tons an hour (about 25,000 bbl.) has been found possible.

For the expansion of the Grangemouth refinery in Scotland a deep-water tanker off-loading installation is being built at Finnart, Loch Long, and pipe lines will connect Finnart with Grangemouth.

The Anglo-Iranian tanker fleet now

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comprises 134 ships of about 1,600,000 d.w. tons. Additional tanker tonnage in the company's employment under various forms of charter amounts to about 2,000,000 d.w. tons, so that some 14 per cent of the world's tanker tonnage is directly employed in the company's trade, exclusive of the large volume of f.o.b. sales to other carriers.

Distribution and sales.—Anglo-Iranian's sales of refined products and crude totaled 30,500,000 tons net in 1949, about 4,000,000 tons more than the previous year. Commenting generally on this phase of company operations, the chairman's report said: "A little more latitude in the conduct of marketing operations was experienced in 1949, but the oil business remained subject to much restraint and complexity by the continuing application of such factors as import restrictions and currency controls. Improvement in the supply position, though retarded by delays in refinery expansion programs, supported a substantial increase in consumption in Europe and the Eastern Hemisphere generally, where the bulk of our business is."

Research.—The magnitude of Anglo-Iranian's research in the refining field is indicated by the fact that during last year 27 basic patents applications were made. Other research concerns processes for the production of diesel fuels and the preparation and evaluation of aviation gas-turbine fuel.

Methods for the protection from corrosion of pipe lines, tankers, and other equipment have been given considerable attention. New laboratories to support the company's marketing and distributing department have been completed and are being commissioned.

Israeli Feelers

American operators being invited to enter country

REPORTS from Israel last week indicated efforts are being made to interest independent American oil groups in exploration and refinery construction in that country.

Bartley C. Crum, former San Francisco attorney and member of the Anglo-American Committee on Palestine, has made certain proposals along these lines to the Israeli Government in Tel Aviv, and it was reported that Edwin W. Pauley, California operator, is being approached in connection with the plans.

Information from Israeli officials, however, was that Crum's proposals were extremely general in nature and that no commitment had been made by the government. David Horowitz, Israeli government economic adviser, told The Oil and Gas Journal in New York that his current trip to this country was merely for routine business purposes, including among other things contacts with oil companies on petroleum supplies. He said his visit had nothing to do with Crum's proposals.

Horowitz came to New York from London, where he discussed with Anglo-Iranian Oil Co., Ltd., the plan for reopening the Haifa refinery at partial capacity in the next few months.

The prospects of major-company exploration in Israel are not at all bright. A virtual state of war still exists between Israel and several of the Arab states which control the Middle East fields. Furthermore, Israel is not considered particularly promising from a geological standpoint.

FAR EAST

No Oil for China

British won't go along on ban of oil sales to reds

NEW YORK headquarters of the two American oil companies marketing in the Far East confirmed last week that they had been directed by the State Department to halt shipments of petroleum products into Communist territory.

The companies are Standard-Vacuum Oil Co. and California-Texas Oil Co., Ltd. The Government acted in an effort to seal off North Korea from any supply of petroleum products, particularly through Communist China.

The two American companies lost virtually all their share of the China market estimated at about 55,000 bbl. daily when the Communist forces completed their conquest of that country last year.

The third major company in the China trade is the Royal Dutch-Shell organization. The trading position of this company has been somewhat better due to the British recognition of the Chinese Communist Government, according to sources in the industry.

British decline.—In view of this, there was considerable interest last week in the reports from Washington that the United States Government had informally requested the British and Dutch governments to take similar action to halt shipments of petroleum to China.

A dispatch from London late in the week said that the British Foreign Office had rejected the American request to stop oil shipments to Communist China. The British Government's position was that the oil supplied by the British companies was "only for civilian consumption."

In Hong Kong, however, E. C. Hubbard, Shell manager there, announced he had received orders from his London office to halt all shipments to communist China not intended for civilian consumption.

"We are not selling any gasoline or oil to China unless we are sure it will not be used to propel tanks and planes," he said. The company manager said there was no conflict between the company's action and the British foreign office statement since the foreign office was talking about a total halt of shipments and did not rule out a reduction of shipments for military use.

In confirming that it had been requested to cease completely for the time being, shipments of products into Communist-occupied territory in China, Standard-Vacuum last week said that it is guided by the policy of the State Department in connection with the conduct of its operations in all foreign areas. Standard-Vacuum pointed out it had been virtually closed down in China for the last 13 months, though it formerly was an important distributor there.

Fuel squeeze.—First reports on the order to halt shipments to Communist China came from Hong Kong. It was said that China had been obtaining some aviation gasoline from a concern in South America which in turn purchased it from an American or British company. The difficulty of controlling such complex relay movements was mentioned.

The loss of the large part of the normal oil supply from non-Communist sources has caused drastic curtailment of consumption in China. The Shanghai Power Co. has converted back to coal, and charcoal burners are being used on many trucks and buses. However, the country has a certain minimum requirement for liquid fuel. It does not appear the Communists can obtain appreciable quantities of oil products from Russia, although some time ago it was reported some shipments were being made from Romania to Shanghai.

AUSTRALIA

Storage Expansion

Vacuum Oil Co., Pty., Ltd., has undertaken a program of expansion of its Australian oil-handling and terminal facilities involving a total addition of about 860,000 bbl. to storage facilities.

The company is the refining and distributing subsidiary in Australia of Standard-Vacuum Oil Co. It recently completed a small refinery at Altona, Victoria, and bulk terminals. According to a report from Sydney, the new program embraces the following:

Completion of new terminals at Rosehill, N.S.W., storage capacity of about 130,000 bbl.; at Bell Bay, Tasmania, capacity of about 100,000 bbl.;

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and at Colmslie, Queensland, capacity of about 85,000 bbl.

Extension of facilities at the company's ocean terminal at Pulpit Point, N.S.W. At Yarraville, Victoria, storage capacity is to be doubled by the completion of three tanks of about 29,000 bbl. each and the proposed addition of storage for 180,000 bbl.

Erection of storage for about 43,000 bbl. at Birkenhead, South Australia, with provision for a further approximately 57,000 bbl. Tanks for an additional approximately 108,000 bbl. are being built at Fremantle, new storage facilities are under construction at Cairns, and extra land has been purchased for expansion at Townsville.

EUROPE

Refining Expedient

German officials propose use of idle hydrogenation plants to boost nation's refining capacity; saving in time cited

Dahl M. Duff

USE of capacity of four hydrogenation plants in the Ruhr region to meet about half the proposed build-up in German refining is being advocated by German oil officials.

A recent German survey reported that about 1,000,000 tons a year (about 20,000 bbl. daily) of hydrogenation capacity is idle in the British and United States areas of western Germany.

This could be repaired and modernized about an estimated cost of DM 50,000,000 ($15,000,000 at the official exchange rate), and could thus process annually about 2,800,000 tons of Middle East crude or about 1,500,000 tons from the Emsland fields.

German plans call for a total refining capacity in the country of 5,300,000 tons (about 106,000 bbl. daily) by 1952-53. However, only 4,720,000 tons of this has thus far been authorized by Allied authorities. To carry out the 5,300,000-ton program western Germany needs some 2,000,000 tons additional capacity. For the fiscal year just beginning, German officials anticipate crude imports of about 2,500,000 tons with domestic production of about 1,250,000 tons.

The German survey said that the hydrogenation facilities could be brought back into operation within a relatively short time while refineries with necessary cracking facilities would require several years to build and involve considerable expense.

Four plants idle.—In the former bizonal area, there are four hydrogenation plants. Completely shut down are the plants at Scholven-Buehr and at Bottrop-Welheim which reached a maximum wartime rate of production of about 4,700 and 3,100 bbl. daily respectively.

The other two hydrogenation plants at Wesseling and Gelsenkirchen are operating at less than full capacity. The Wesseling plant, which reached a maximum production rate of about 4,750 bbl. daily in 1944, is working at about three-quarters of its hydrogenation capacity under contract with the Shell company. The Gelsenkirchen plant, under contract with Jersey Standard and Socony-Vacuum's German subsidiaries, also is below full capacity. Maximum wartime rate at Gelsenkirchen was about 8,500 bbl. daily production output.

The Gelsenkirchen and Wesseling plants resumed limited operation in the fall of 1948. The licenses from Allied officials authorizing the operations permitted treatment of about 3,500 bbl. daily of crude residual in each plant. Permission also was given for the repair of topping capacity to the level required for handling the permitted amounts of residue. This amounted to about 9,500 bbl. daily in each installation.

These hydrogenation plants, along with the Fischer-Tropsch plants, of which there were six in western Germany, were supremely important sources of Germany's liquid-fuel supplies during the war. They were subjected to concentrated Allied bombing, and all severely damaged, some to the point of practical destruction.

Dismantling resisted.—Original Allied plans for the dismantling of much of this synthetic oil production capacity were strenuously resisted by Germans. Like other European countries, Germany is anxious to have refining capacity sufficient to end dependence on imported products.

The principal difficulty in refining large quantities of imported crude in Germany is the lack of an internal market for the quantities of fuel oil thus produced. Hydrogenation of fuel oil into gasoline and diesel oil meets this problem. As far as the expanding indigenous Emsland production is concerned, it is considered that the most satisfactory way of handling it is by cracking.

French Agency Dead

Groupement d'Achat des Carburants (GAC), the joint petroleum buying organization of French importers, officially passed out of existence at the end of June.

The organization functioned under contract with the French Government. A bill was recently passed by the French parliament terminated this arrangement.

A French Oil Industry Agency has been formed by importers and refiners to handle certain functions formerly performed by GAC. These principally are administrative, including the making of payments.

The new agency has headquarters in this country at 50 Broadway in New York. Its United States representative is Marcel Thomas, who formerly represented GAC. Thomas will continue to assist in connection with the Economic Cooperation Administration's petroleum program in France.

GAC was formed in 1941 as a syndicate of oil importers to handle jointly purchases of petroleum. Crude, the main French import, was returned to direct private imports about 2 years ago, and after that time only lubricating oils in bulk and certain other specialties were handled by GAC. As a result of GAC's liquidation, all products as well as crude will be handled privately.

There has been no change in the status of S. N. Marep, an autonomous French organization which arranges for purchases of exploration and drilling equipment by the French companies.

British Deal

Aramco arranges for use of sterling in its operations

ARABIAN AMERICAN OIL CO. announced last week in New York that it had reached an agreement with the British Government which will permit the company to utilize sterling in its operations.

The arrangement represents another of the individual company agreements being reached with the British to meet the sterling-dollar oil problem.

The Aramco agreement will allow the company to spend sterling for purchases of materials needed in Saudi Arabia and for payment of royalty to the Saudi Arabian Government.

As the leading American producing company in the Eastern Hemisphere, Aramco disposes of its production directly to its four parent companies, Standard Oil Co. of California, The Texas Co., Standard Oil Co. (N. J.), and Socony-Vacuum Oil Co., Inc.

These companies, the first two represented jointly by California-Texas Oil Co., Ltd., have been working out plans with the British Government permitting them to receive sterling in their marketing operations. The sterling which Aramco is now enabled to utilize is that with which the parent companies will pay Aramco for their shares of the joint production.

Discussions continue.—Jersey Stand-

ard and Caltex are receiving some sterling from their sales which meet the increased consumption resulting from derationing of motor fuel in the United Kingdom. Further discussions between the American companies and the British Government are being held, and it is anticipated that other agreements modifying the British currency restrictions will be made known shortly.

The tight controls held by the British on sterling transactions have heretofore prohibited trading in this currency by American companies. Thus placed at a disadvantage in many dollar-short foreign areas, the American companies and the U. S. State Department have sought liberalization of these restrictions.

Aramco some time ago began shifting its expenditures over to a soft-currency basis.

Aramco statement.—The full announcement of Aramco said:

"Negotiations between the British Government and the Arabian American Oil Co. have opened the way for Aramco to utilize sterling in some of its overseas transactions. The company has been aided in its discussions by the U. S. Department of State.

"Companies which market Aramco oil are making arrangements to pay Aramco in sterling and other currencies. The talks with the British were for the purpose of adjusting exchange restrictions so that sterling received from the marketing companies could be used by Aramco for purchases of materials needed in Saudi Arabia and in royalty payments to the Saudi Arabian Government.

"As a result of the talks in London, Aramco expects its production in Saudi Arabia to average about 490,000 bbl. per day for the year 1950. It had been expected that the average during the year would amount to less than that figure, but utilization of sterling would enable Aramco's affiliated companies to retain markets which otherwise might have been lost."

LAST TO REBUILD.—Small-scale oil operations are being carried on in Burma, although prolonged civil strife has prevented the country from regaining any significant part of its prewar importance. Shown here are drums being loaded on a barge in preparation for a trip up the Irrawaddy River to Mandalay, the old capital of Burma. Burmah Oil Co. (Burmah Concessions), Ltd., produces about 500 bbl. daily from the Chauk and Lanywa fields. A small makeshift skimming plant is operated at Chauk, and most of the products are barged to Mandalay in occasional convoys which are escorted by Burma Army troops. B.O.C.'s large refinery at Syriam near Rangoon was destroyed during the war. Reconstruction cannot be completed while the pipe line from the central Burma fields is inoperative due to conditions in the country. Prewar Burma produced about 21,000 bbl. daily. Today it remains the only important oil country that has not recovered its prewar position.

LATIN AMERICA

Pipe-Line Contract Let

Williams Brothers has signed a contract for surveying and engineering for a products pipe line from Salgar on the Magdalena River to Bogota, the capital of Colombia.

The project is intended to relieve Bogota's dependence on railroad shipments of petroleum products. The 136-mile line will rise from 640 ft. at Salgar to 8,659 ft. at Bogota.

Reports from Bogota said the survey and engineering study will cost Ps. 200,000 ($100,000) and would be completed within 90 days. The line itself, which will deliver about 2,000 bbl. daily, is to be completed and placed in operation within a year.

Tropical Oil Co., the main producing, marketing, and refining company in Colombia, has made a loan of Ps. 6,000,000 for the line to the Department of Cundinamarca. The Salgar end of the line is reached by river barge, although one 69-mile, 6-in. line now extends up river from the Tropical refinery at Barrancabermeja to Cantimplora.

Products Line Authorized

Shell Caribbean Petroleum Co. has received authorization from the Venezuelan Government's Ministry of Development to construct a pipe line to carry light products from La Paz field in Western Venezuela to the company's terminal at Palmarejo on Lake Maracaibo.

Shell Caribbean has recently built a gas-absorption plant in La Paz field designed to recover approximately 93,000 gal. daily from an intake of 39,000,000 cu. ft.

It is reported that two pipe lines of 3 and 4-in. diameter will be constructed by La Paz to Cuatro Bocas. A 4-in. will extend on to the Palmarejo terminal.

"Esso" Enters Argentina

Names of four Standard Oil Co. (N. J.) affiliates in Argentina have been changed as a part of the company's world-wide program to include the word "Esso" in the names of its foreign affiliates where possible.

The new company names in Argentina have been sanctioned by the Argentine Government. It is understood some consolidation of these four Argentine affiliates is planned later.

Cia. Nativa de Petroleos, S.A., becomes Esso Refinadora de Petroleo, S.A.; Transportadora de Petroles, S.A., becomes Esso Transportadora de Petroleo, S.A.; Standard Oil Co., Argentina, becomes Esso Productora de Petroleo, S.A.; and West India Oil Co., S. A., becomes Esso S.A. Petrolera Argentina. These are the refining, transportation, production, and marketing affiliates respectively.

Record Oil Revenue

WASHINGTON.—The Mexican treasury this year will secure $44,400,000 from taxes and other payments of Petroleos Mexicanos, the company reported this week on the basis of 6 months' operations.

In a statement issued through its Washington information office, Sen. Antonio J. Bermudez, director general of Pemex, said the 1950 revenue will be more than four times the largest amount ever received by the Mexican government from oil development before nationalization of the industry.

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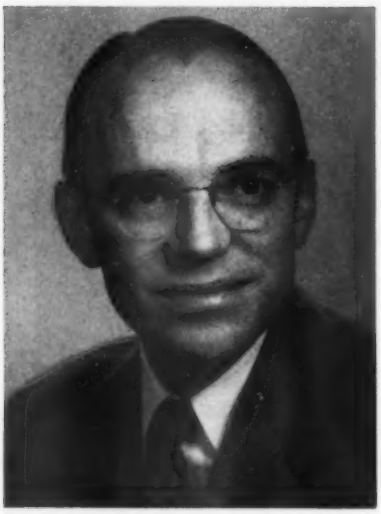

In New Position

Todd serves California Co. in New Orleans

J H. TODD is now serving as southern division exploration superintendent for the California Co., in New Orleans, a post formerly held by L. I. Brown, who recently became assistant general manager of exploration.

Todd, formerly superintendent of the geophysics division in New Orleans, graduated from Dartmouth University in 1938. He served as an instructor in geology at the University of Minnesota, and worked on his doctor's degree in geology, which he received in 1942.

Joining the California Co. in 1942, he served as a geologist in the geophysics division from 1942 to 1946, and from 1946 to 1947 was development geologist in the Brookhaven and Mallalieu fields, Mississippi.

In February 1948 Todd was named superintendent of the geophysics division, a position held until his recent appointment as exploration superintendent for the southern division.

He is a member of the Society of Sigma Xi, the American Association of Petroleum Geologists, Society of Exploration Geologists, and Phi Gamma Delta social fraternity.

V. B. Porter, junior mechanical engineer for Shell Oil Co., has been named exploitation engineer in the division production office at Franklin, La. Other recent changes in the company's New Orleans area include: **H. O. Amadon,** exploitation engineer, transferred from Franklin, La., to the Delta district; **R. W. Johnson,** exploitation engineer, transferred from the Delta district to the New Orleans division; **D. R. Meier,** junior geologist in Houston, named subsurface geologist at Baton Rouge, La.; **J. P. Moore,** junior exploitation engineer in Houston, named exploitation engineer at Franklin, La.; **J. J. Offenhiser,** junior geologist in Houston, named subsurface geologist at Jackson, Miss.; and **H. L. Shatto,** mechanical engineer, Houston region, named New Orleans area development engineer.

R. C. Steinhoff, construction and maintenance engineer, has been named assistant department head, thermal cracking, at the Texas City refinery of Pan American Refining Corp. He fills the position vacated by **Frank K. Webb,** who was transferred to the personnel department as assistant personnel director. At the same refinery, **Brady V. Tunnell** has been transferred from assistant department head, catalytic and distillation, to assistant department head, light oils department; **Raymond A. Schmitt** has been made supervisor of labor relations and personnel research; **Alton B. Embry** has been named supervisor of benefits and records; and **Lansing B. Robertson** has been named process foreman of the chemicals plant.

Oscar A. Fuchs has been named area foreman of Pan-Am Southern Corp.'s El Dorado, Ark., refinery.

Weldon M. Padgett, controller of the Schlumberger Well Surveying Corp., has been elected president of the Houston chapter, Controllers Institute of America. Other officers include: **John B. Cookenboo,** Houston Natural Gas Co., and **George L. Duwe,** Cameron Iron Works, vice presidents; **Paul M. Garmany,** Hughes Tool Co., secretary-treasurer; and **Ronald L. McVey** and **Carl B. Myers,** Tennessee Gas Transmission Co., and **Charles C. Spatling** and **Fladger F. Tannery,** Humble Oil & Refining Co., directors.

L. L. Jupe has been named manager of personnel and industrial relations for the Montreal division, Shell Oil Co. of Canada, Ltd. He is succeeded as manager of the same departments in the company's Montreal refinery, by **H. P. Dufresne. C. Warren,** shift supervisor, has been named day supervisor of the topping and cracking department of the Montreal refinery.

Robert W. Zinser has joined the Midland, Tex., office of Sun Oil Co. as junior geologist, and **Gilbert N. Freeman** has been given a special assignment for Sun in the Dallas offices as junior geologist.

Thomas J. Kelly, a retired U. S. Navy rear admiral, has joined Socony-Vacuum Oil Co., Inc., as assistant to the chairman of the board. He recently completed 4 years' duty in the Office of the Chief of Naval Operations, and has served on joint staff committees. A graduate of the Naval Academy in 1920, he is also a graduate petroleum engineer from the University of Pittsburgh.

C. E. Meyer, a vice president and director of Standard-Vacuum Oil Co., is retiring after 37 years' service with the company. He first went to China in 1913 and later was general manager for Standard-Vacuum in Japan. After repatriation in 1942, he served as wartime petroleum attache in the United States Embassy in London. Returning to company service in 1945, he supervised its Japan and China activities, all tanker operations, and the company's employe and public-relations programs.

Daniel Boyle has been named shift foreman in the steam and power department at Esso Standard Oil Co.'s Bayonne, N. J., refinery.

G. M. PARKER

George M. Parker, who has been with the Standard Oil Co. (N. J.) organization for 22 years and lately as adviser to foreign marketing operations, has been elected vice president of Esso Export Corp. and designated to take charge of a new European administrative office of the company. Esso Export is the international sales affiliate of the Jersey company. **W. J. Haley,** president of Esso Export, said Parker will maintain close contact with all foreign affiliates of the Jersey company and "assist in the working out of any special supply problems that may arise due to present-day world economic conditions."

J. A. Hart, formerly general foreman of boilermakers, has been made general foreman of pipefitters at the Baton Rouge refinery of Esso Standard Oil Co. At the same plant, **Stanford Rayne,** formerly general foreman of the motorized-equipment division, has been made general foreman of the general labor division. **J. H. Mc-**

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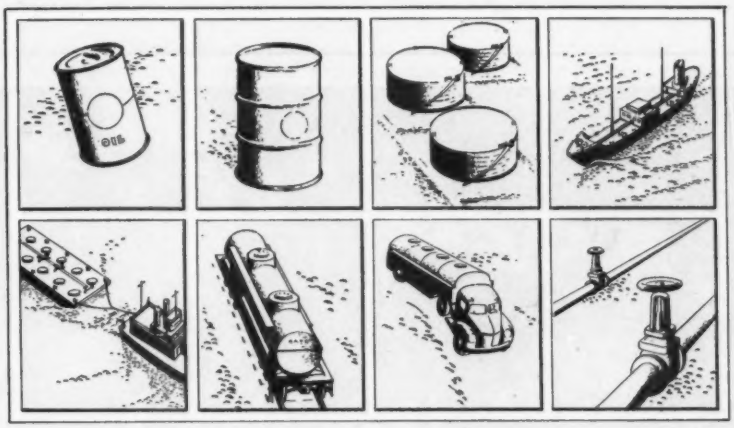

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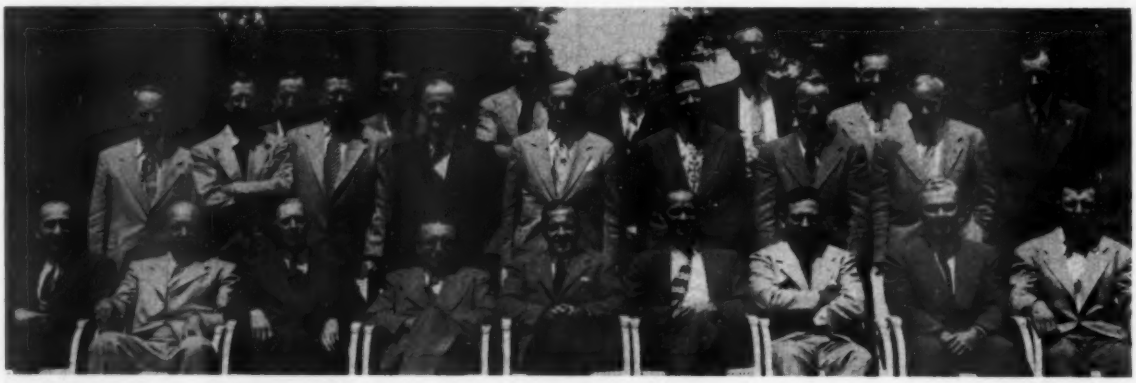


PURE REFINERS.—Twenty-four Pure Oil Co. research and technical men from the company's refining division met in Crystal Lake, Ill., recently, to view the new research and development laboratories which are nearing completion. The trip concluded a 5-day refinery-technical symposium, led by A. E. Harnsberger, technical operating manager, who served as chairman. Front row, left to right: M. M. Marisic, W. J. Backhoff, and L. M. Henderson, research and development laboratories, Crystal Lake; A. F. Spiehler, Harnsberger, and W. L. Bowler, refinery-technical division, Chicago; J. G. Eckhouse and E. P. King, Smiths Bluff refinery, Nederland, Tex.; and R. Vittinghoff, Toledo, Ohio, refinery. Second row, left to right: E. M. Gooch, Midland, Mich., refinery; P. A. Maschewitz, refinery-technical division, Chicago; C. A. Porter, research and development laboratories, Crystal Lake; W. A. McBurney, Toledo refinery; G. Rollins, engineering department; H. N. Frost and M. A. Furth, Smiths Bluff refinery, Nederland; G. F. Eisele, Heath refinery, Newark, Ohio; and H. A. Alves, refinery-technical division, Chicago. Back row, left to right: C. Hulbert, Cabin Creek, W. Va., refinery; J. E. Trexler and H. W. Boesel, Toledo refinery; C. M. Ridgway, research and development laboratories, Crystal Lake; D. N. Mills, refinery-technical division, Chicago; and C. E. Shauck, Heath refinery, Newark.

Adams, who was the motorized equipment head, took Rayne's place as head of general labor.

John M. Kindle, formerly assistant superintendent of gasoline plants for Lone Star Gas Co., Dallas, has been named superintendent of gasoline plants, succeeding **Fred H. Townsend,** resigned.

Z. C. Ambrose, vice president, Southwest Gas Producing Co., Inc., and Carbons Consolidated, Inc., of Monroe, La., has been elected president of a subsidiary company, Monla Gas Co., Inc., of Monroe.

Jose Jaramillo-Giraldo, Colombia senator, has become head of the National Petroleum Council in Colombia. He succeeded **Jaime Duque** under the policy of rotating the presidency.

W. G. Weston has been appointed general manager of the marine department of Anglo-Saxon Petroleum Co., Ltd., succeeding **R. J. E. Dodds,** who is retiring. Since September 1948, Weston has been joint general manager of the department with Dodds at the London headquarters of the company. Dodds served with the Royal Dutch-Shell Group nearly 30 years and took a leading part in the expansion of its marine activities since the war.

G. L. Nelson, formerly production superintendent for Magnolia Petroleum Co. in the Kermit, Tex., district, has been named district superintendent of the company's Pampa, Tex., district succeeding **J. S. O'Brien,** who retired on July 1. **W. Brantley Jackson** has been transferred from the Dallas general offices to Roswell, N. M., to assist **S. P. Hannifin,** district land man; **Marvin S. Jones** has been transferred from the land department in San Antonio to Dallas; and **John E. Shannon** has been elevated from assistant superintendent of the Lake Charles and Louisiana Gulf area, Vanderbilt district, to district superintendent of the newly created Lake Charles district.

C. W. Riggs, who has been chief station operator at the Guasimito pump station of the Puerto La Cruz pipe line of S.A.P. Las Mercedes in Venezuela, has been appointed superintendent of the pipe line. He succeeds **E. T. Johnson** who has returned to the United States. At the Guasimito station, Riggs has been succeeded by **C. M. Banning.**

Peter C. Badgley, one of four Canadians granted scholarships by Imperial Oil, Ltd., Westmount, Que., will do work in geology at McGill University; **Roger Chartier,** Sherbrooke, Que., will work in industrial relations at Laval University; **Jacques M. Bonneville,** Hull, Que., will study gas dynamics at McGill University; and **David B. Harper,** Victoria, B. C., will study gas-turbine development at the University of British Columbia.

John A. McCutchin, Bay Petroleum Corp., has been transferred from Calgary, Alta., Canada to the company's Midland, Tex., office where he will assume the duties of division manager and land man. **John H. DeFord** will continue as division geologist at Midland.

Walter R. C. Miller, coordinator of the world-wide mechanical shop-modernization program for Standard Oil Co. (N. J.), has retired from active duty with the company after more than 30 years of service. He joined Midwest Refining Co. in Wyoming in 1919.

Peter G. Burnett, reservoir engineer at Longview, Tex., for Stanolind Oil & Gas Co., has been transferred to Tulsa as petroleum engineer.

Raymond Parker, Superior Oil Co. of California, has been elected president of the Corpus Christi Oil Scouts Association. Others elected include: **E. R. Simpson,** Standard Oil Co. of Texas, and **E. L. Palmer,** Cities Service Oil Co., vice presidents; and **John McReynolds,** Continental Oil Co., secretary-treasurer.

Everett C. Cook, Michigan division engineer for Sun Oil Co., has resigned and will be succeeded by **M. E. Austin** who has been a Sun employe for the past 10 years. Austin came to Michigan from Sun's Dallas division in 1947.

Donald D. McGirk, senior field geologist for Texas Petroleum Co., has been transferred from the Venezuelan to the Colombian division in that capacity. **J. F. Tindol,** who has been district superintendent for the company at Maracaibo, has returned to the United States, and has been succeeded in Maracaibo by **R. E. Wright.**

L. F. McCollum, president of Continental Oil Co., Ponca City, Okla., is now in Houston where the company's executive division was recently transferred. Others moving to Houston include: **W. C. MacMillan,** executive vice president and director; **Harry J. Kennedy,** vice president, marketing; **R. L. Bosworth,** financial vice president and treasurer; **Serge B. Jurenev,** vice president in charge of coordinating and planning; **T. F. Dowd, Jr.,** controller; **A. W. Tarkington,** assistant to the president; **E. W. Webb,** manager of production; **John Post,** manager of industrial relations; and **George W. Evans,** manager of transportation and purchasing. **Ira H. Cram,** vice president of exploration and production, and **Lloyd F. Thanhouser,** vice president and general counsel, have been headquartered in Houston since last fall. **Harold G. Osborn,** vice president of manufacturing, will continue to operate in Ponca City. Regional managers are: **Charles A. Perlitz, Jr.,** southern region, Houston; **E. F. Battson,** Rocky Mountain region, Denver; **C. R. Allen,** western region, Los Angeles; **J. W. Liddell,** eastern region, New York City; and **J. L. Wait,** northern division, Chicago.

E. A. Markley, formerly chief geologist for the former Barnsdall Oil Co., has been named senior division geologist and supervisor of exploration for West Texas, Abilene, and the North Texas districts of Sunray Oil Corp., under **Don O. Chapell,** Tulsa, vice president and manager of the exploration and land departments. Other changes include: **Marion J. Moore,** formerly Sunray district geologist at San Antonio, named division geologist and supervisor of exploration for the South Texas, Texas Gulf Coast, Louisiana, and Mississippi districts; **Sherril A. Shannon,** formerly Sunray district geologist at Wichita, named division geologist and supervisor of exploration for Kansas, Oklahoma, and the Rocky Mountain states; **Harold G. Picklesimer,** advanced to district geologist in the San Antonio area succeeding Moore; **Ralph C. Lamb,** formerly district geologist for Barnsdall, named to replace Shannon as district geologist for Kansas; **Robert O. Burkett,** geologist in Tulsa, transferred to Sunray's Midland, Tex., office as geologist; and **Karl F. Martin, Jr.,** formerly in the Tulsa office, transferred to Midland as scout.

Glen M. Ruby, vice president of Exploration Contractors, Inc., has moved his offices from Laguna Beach, Calif., to Salt Lake City, Utah.

E. L. Sinclair has been named assistant to **R. R. Jackson,** manager of Socony-Vacuum Oil Co., Inc.'s Paulsboro, N. J. refinery, transferring from the refinery-engineering department in New York City. Other changes include: **R. M. Chesney,** appointed operating superintendent of the plant; **T. C. Lockhart,** named to succeed Chesney as assistant operating superintendent; and **J. L. Lawrence,** named chief engineer replacing **E. H. Atwood,** who has retired recently after 38 years of company service.

O. L. Maag, Timken Roller Bearing Co., has been elected chairman of Committee D-2 on Petroleum Products and Lubricants of the American Society for Testing Materials. **Harold M. Smith,** U. S. Bureau of Mines, Bartlesville, Okla., is the new first vice chairman; **L. C. Beard, Jr.,** Socony-Vacuum Oil Co., Inc., is continuing as second vice chairman; and **W. T. Gunn,** director of refining for American Petroleum Institute, has been reelected secretary. **L. C. Burroughs,** Shell Oil Co., New York, was elected to the advisory committee of Committee D-2.

Frank H. Hughes has been appointed director of purchases of American Natural Gas Service Co., Detroit.

R. A. Shelley, geologist in the Kansan division of Bay Petroleum Corp., Denver, has been named division geologist. Other changes include: **John Allen,** geologist at Wichita, transferred to Oklahoma City in that capacity; **J. P. Wasinger,** landman at Wichita, transferred to the title division at Denver; and **John C. Martin, Jr.,** named division manager in Canada, transferred from New Orleans.

DEATHS

Cecil D. Meltabarger, 56, assistant to the management, general domestic-sales department, The Texas Co., New York City, died July 1 in Yonkers, N. Y.

John H. Anderson, 86, president of Oil Springs Oil & Gas Co., which was recently sold to Union Gas Co. of Canada, Ltd., died recently at Petrolia, Ont., Canada.

Charles Van Keuren, 72, Detroit independent oil producer and wildcatter, died June 30.

Leon G. Thompson, 54, Mount Pleasant, Mich., oil producer and drilling contractor, died July 2 in Detroit.

Dr. Fred M. Douglass, 66, Toledo physician and Michigan independent oil producer, died July 4.

Fred W. Grey, 77, retired superintendent of the Destrehan, La., refinery of Pan-Am Southern Corp., died June 3 in Seattle, Wash.

J. R. Turnbull, 75, pioneer driller and producer, died June 22 in Austin, Tex. He was a partner in Carpenter Drilling Co. and the producing firm of Turnbull & Irwin.

William Oscar Crain, 72, retired general attorney for The Texas Co. died in Houston July 1. Crain, one of the company's earliest employes, was general attorney from March 1932 until February 1945, when he retired.

Chester H. Elliott, 53, traffic-division manager for Carter Oil Co., Tulsa, died July 11. He had been with the company for 27 years.

Scott Stanfield, 59, pioneer oil operator, died in Monahans, Tex., July 5.

Ralph Shaw, superintendent of right-of-way and claims for Lone Star Gas Co., Dallas, died July 6.

Dr. Otto August Beeck, 45, associate director of research for Shell Development Co., Emeryville, Calif., died July 5.

Harry R. Denton, 80, retired land man for Skelly Oil Co., died near Winslow, Ark., July 7.

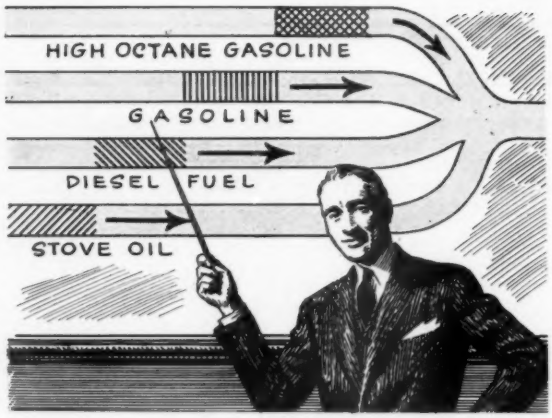
Burton E. Northrup, 64, who established Washington Engine & Pump Co., which he later sold to National Transit Pump & Machine Co., Oil City, Pa., died in Washington, Pa., June 26.

XUM

WHY USE RADIOACTIVE TRACERS?—As the accompanying chart indicates, a variety of petroleum products—those of Standard of California and other companies as well—will travel through the line. The problem is to make sure the right product goes into the right storage tank at takeoff points and at the end of the line.

Other products pipe lines have this problem, of course. On the new Salt Lake products pipe line, however, the problem is unusually complicated. There are many different products to be kept separate . . . from diesel oil to high-octane gasoline. The pipe line is a long one.

There are many takeoff points. None of the common methods, therefore, seemed satisfactory. But the new radioactive tracer method, developed especially for this project, will provide a definite and dependable marker between products and assure proper handling at destination points.



New Method Developed to Identify Interfaces in Product Pipe Lines

by A. P. Howell* and R. K. Bond*

ONE of the most interesting operating features of the line of Salt Lake Pipe Line Co. is a new method developed for following the "interfaces" (boundaries) between products moving through it. This method uses very minute quantities of a radioactive isotope tracer injected into the line each time a product is changed.

Sensitive Geiger counters, coupled to recording instruments, detect and record the passage of radioactivity in the interfaces at various points along the line. From this record the operators can both identify interfaces as they pass and keep the products properly separated as they are delivered to tankage. The details of this operation and the precautions taken to insure completely safe operation are given in the following paragraphs.

Problem of Identifying Interfaces

The need of identifying interfaces in product pipe lines is not new, and the many lines now operating use a number of methods, including gravitometers, colored die plugs, hand samples, and careful dispatching. None of these common methods appeared either accurate or convenient enough for the Salt Lake products pipe line, principally because of the following complicating factors:

1. The relatively small amount of individual product taken off at any one point, as compared with larger products lines elsewhere in the country.

*Engineering department, Standard Oil Co. of California.

2. The many takeoff points (seven) and a terminal at which products are distributed.

3. The length of the line—566 miles.

4. The many different products pumped through the line, including several different types and grades of gasoline, diesel oil, and stove oil that must be identified and delivered at various points.

For these reasons, it was desired to develop a new method of marking product interfaces. This method would need to be independent of the physical properties of the products and give a clear and reliable indication of both the location of an interface and the extent to which the adjacent products had commingled with each other.

The requirements could best be met by a "tracer" employing a radioactive isotope. In order to verify that the method would work, California Research Corp. and the engineering department of Standard Oil Co. of California undertook an extensive development program.

First step in the program was to explore the spread of a radioactive tracer solution in a relatively short section of pipe line. After these results were studied, full-scale tests were made on a 180-mile crude pipe line from Rangely, Colo., to Salt Lake City.

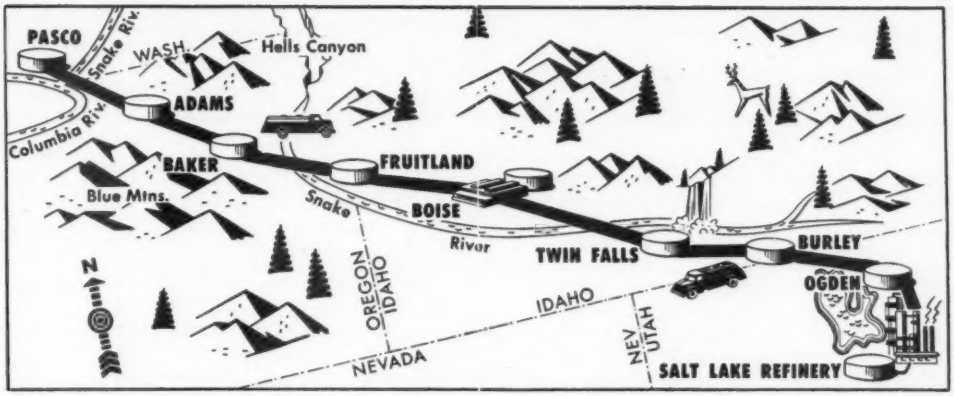
It was found that the tracer traveled through the line with the oil and that it spread in close agreement with the anticipated diffusion between two adjacent products flowing through the line. It was easily possible to detect the radioactivity of the greatly diluted tracer liquid when it arrived at the terminal of the line.

The California Research Corp. laboratories then investigated radioactive isotopes and developed a compound of radioactive antimony as the most suitable for routine use. Finally, a test injection was made in a California products pipe line to confirm the suitability of this tracer compound.

Methods and Equipment

Isotope preparation.—First step is preparation of the tracer compound in the Richmond laboratories of California Research Corp. For this purpose ordinary nonradioactive antimony is used. The material is then sent to the laboratories of the U. S. Atomic Energy Commission at Oak Ridge, Tenn., where it is placed in an atomic pile and subjected to neutron bombardment for the necessary period. In this process some of the stable antimony is converted to a radioactive form. The compound itself is to all appearances the same, but it now gives off the penetrating rays that are the basis for its use as a tracer.

This "hot" material is returned in a lead-shielded box to the California Research Corp. laboratories, where it is further processed and diluted with light oil to become the tracer liquid. This liquid is shipped to Salt Lake in a stainless-steel vessel enclosed in a heavy cast-steel shipping con-



SALT LAKE PIPE LINE CO. (subsidiary of Standard Oil Co. of California) is constructing a products pipe line from Salt Lake City to Pasco, Wash.—a distance of 586 miles. The line is now in operation to Boise, Idaho, and will be completed to Pasco in the early fall of 1950. It is a common-carrier pipe line available for transportation of products from the Salt Lake City area to certain points in Utah, Idaho, eastern Oregon, and eastern Washington. It is expected that products of several different types and grades will be transported. Under the Salt Lake Pipe Line Co.'s tariff, these will be shipped as individual stocks rather than on the "common stock" basis used by some products carriers.

tainer that serves both as carrying case and shield.

Injection apparatus.—At the Salt Lake pump station the tracer liquid sent from the Richmond laboratory is stored in a stainless-steel vessel behind heavy lead shielding. The injection system itself was carefully designed to permit handling the radioactive liquid with complete safety to the operators. All operations are by remote control, with valve handwheels extending beyond the shielding.

Mirrors are used for observation of the tracer liquid when the injection quantity is measured in a gage glass. This is the only place in the entire installation outside of the laboratory where the radiation levels are sufficiently high to require precautionary measures.

Each time the product pumped through the line is changed, a few cubic centimeters of the tracer liquid are metered out and injected into the pipe line just at the interface. The tracer then follows the interface through the line and can be easily detected with suitable instruments.

Instrumentation.—Conventional laboratory instruments redesigned for industrial use were installed at stations along the line to measure the radiation in the interface. At each station several Geiger-Mueller counting tubes and a preamplifier are strapped to the pipe to detect the passage of radioactive material in the oil stream. The outputs from these tubes are fed into a specially designed counting rate meter which is connected to an appropriate recorder.

The Geiger-Mueller tubes and rate meter are continuously reading the "background" of the natural cosmic radiation that is always present. This background count is suppressed in the recording instruments, so that a record is made only of the additional radiation picked up when the interface passes the instrument. The recorders are of the strip-chart type and are so calibrated that the curve trace extends nearly the full width of the chart at the peak of radiation intensity corresponding to the center of the interface.

Instruments were installed at the Salt Lake pump station, where a single recorder provides a record of each injection and indicates approximately the amount of radioactive material used each time. At points where only product "heart cuts" are to be taken out, one set of instruments was installed, with the tubes on the pipe at the incoming manifold.

At the terminal and other points where the full stream is taken, the usual equipment was installed and, in addition, provision was made to telemeter the arrival of the interface from a point out on the line. This is accomplished by a second set of tubes and a counting rate meter located upstream of the station at a distance greater than the total width of the interface anticipated. Near the end of the line this distance is as great as 7 miles. The output of this meter is telemetered by wire or F.M. radio to a second recorder at the station.

Method of Operation

Tracers for controlling product movements. — With the instrumentation described above, it is possible accurately to identify the passage of the interface at each takeoff point along the line. The pipe-line dispatcher maintains close control over the position of all the products in the line from the records of interface passage reported to him by the operators at the various takeoff points. With the information available to him, he need not predict the exact time of arrival of each interface at each station.

Also, the station operator need not waste hundreds of hours a year standing by to "catch" the interface passage with a gravitometer when the cut is to be made in an interface. The recorded trace of interface radioactivity at each station always indicates the locations of the products in each section.

At takeoff points where only a heart cut is to be taken from the moving stream, the operator need only verify from the tracer chart that the interface has passed. Then, in accordance with instructions from the dispatcher, he will withdraw the required amount of that product to tankage.

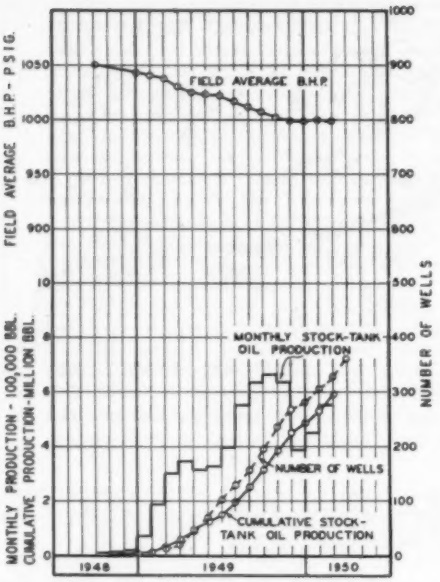
At the terminal and at other points where it is necessary to take the entire stream, including an interface, the problem of separating the two products becomes more complicated. It is for this reason that advance telemetering of the interface is used at such locations.

The record transmitted from the upstream counting rate meter provides a warning of the approaching interface and gives the operator the peak counting rate corresponding to the center of the interface. With this information, using the recorder at the manifold, the operator can "cut" the product at some predetermined percentage of the peak counting rate corresponding to the most desirable blending of each product. If it is necessary to take a "slop cut" in order to maintain product specifications, this can be done with a minimum loss of product and with better knowledge of the exact composition of the "slop."

Radiological Safety

The only point on the pipe line where special precautions are necessary to assure the safety of the operating personnel is the Salt Lake station where the tracer liquid in its concentrated form has a high radiation level. The precautions taken with the injection equipment have already been described. The injectors installation is so designed that the radiation level at the surface of the enclosure is well below the amount established as safe by the National Committee on Radiation Protection.

(Continued on page 90)



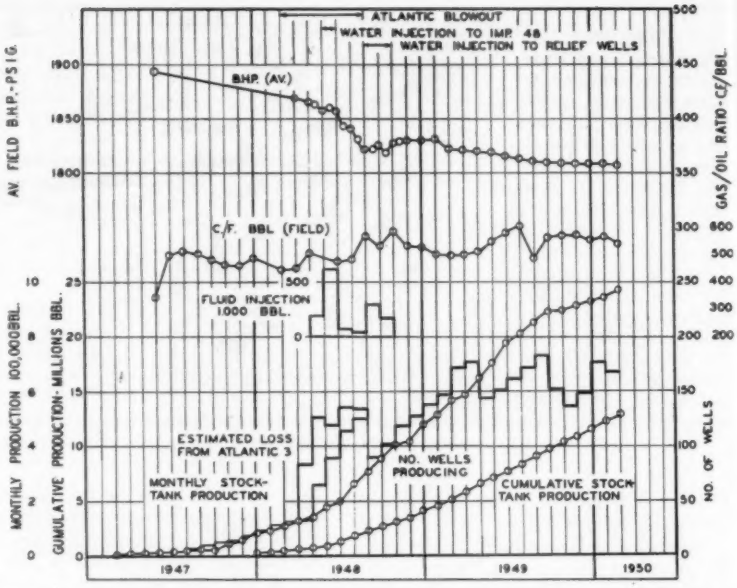


Fig. 1—(Left) Redwater field, (Petroleum and Natural Gas Conservation Board data). Original field bottom-hole pressure was 1,050 psig. Average bottom-hole pressure March 1, 1950, was 998 psig. Average gas-oil-ratio curve has been omitted. Since all wells are producing at a pressure well above the bubble point of 485 psig., the producing gas-oil ratio will be essentially equal to the solution gas-oil ratio as determined by gas liberation from subsurface reservoir fluid samples. The solution gas-oil ratio as determined by differential liberation is 161 cu. ft. per barrel. Cumulative production to March 1, 1950, is 5,827,127 bbl. Number of completed wells shown on graph is number capable of producing as of end of month. This does not include wells waiting on pump, standing, or testing prior to being placed on steady production. As of May 1, 48 wells had pump installations completed and several others were standing waiting on pump. Fig. 2—(Right) Leduc D-3 zone (Petroleum and Natural Gas Conservation Board data). Original field average bottom-hole pressure was 1,894 psig., referred to datum of —2,980 ft. The bottom-hole pressure as of December 1, 1949, was 1,808 psig., and as of March 1, 1950, had declined only to 1,806 psig. During this 3-month period, 1,960,000 bbl. of oil was produced, bringing cumulative to 12,881,400 bbl. Average gas-oil ratio for field was fairly constant over 3-month period of 560 cu. ft. per barrel.

ALBERTA OIL FIELDS

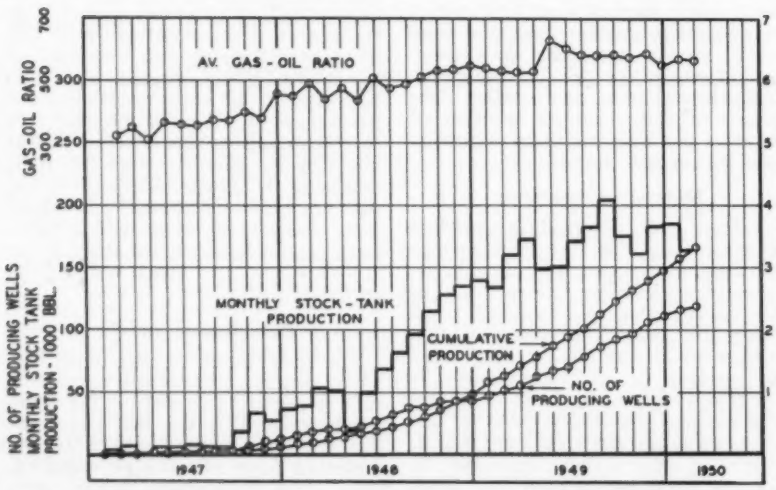


Fig. 3—(Left) Leduc D-2 zone (Petroleum and Natural Gas Conservation Board data). In this pay, there are considerable differences in the static or equilibrium bottom-hole pressures of individual wells. Some recently drilled wells show pressures near original field 1,760 psig., while the oldest producers show a decline to 1,475-1,500 psig. Average gas-oil ratio of about 560 cu. ft. per barrel showed little change in 3-month period December 1, 1949, to March 1, 1950, while 544,050 bbl. of oil was being produced, to bring cumulative total to 3,314,750 bbl. On March 1 there were 119 wells capable of producing, an increase of 12 over 3 months previously. There were 14 of these wells on the pump.

by Philip C. Ingalls
Associate Editor

WHILE exploration efforts in western Canada continue at an ever-accelerating pace, the past few years' discoveries are deep in the development stage.

The Alberta fields are being developed and produced in an orderly, systematic, and scientific manner. The dedication of Imperial Oil's natural gasoline-gas conservation plant to serve the Leduc area was a recent impressive step in further utilization of produced hydrocarbons. Less impressive, but of great importance along a similar line, are the operators' efforts to obtain reservoir data for the purpose of efficient operation of those reservoirs opened to production. By constantly measuring bottom-hole pressures, testing bottom-hole samples, and analyzing formation conditions, these operators are accumulating data that are forming a picture that show these reservoirs should be produced for maximum recovery.

Leduc, discovered in February 1947, now has over 400 wells. This field

produces from the D-2 zone at 4,950 ft. and the D-3 zone at 5,250 ft. In the Woodbend sector there is Lower Cretaceous production.

Redwater now has 460 wells. Only the D-3 zone is producing in this pool which opened in August 1948.

Stettler was discovered in September 1949 and is now producing from six wells. Both the D-2 and D-3 zones are productive at Stettler from 5,200 and 5,350 ft., respectively.

The engineering section of the Alberta Petroleum and Natural Gas Conservation Board is carefully watching the performance of the various Devonian reef and Lower Cretaceous and reservoirs in Alberta's new oil fields. The board makes periodic reports, accompanied by charts, to all operators in each field. The latest versions of these charts for the largest reservoirs producing to date are shown in Figs. 1 to 6.

Will an active water drive develop in any of these reservoirs? That is the big question and at this time there does not appear to be sufficient reservoir history to answer the question conclusively. It is possible that a source of water energy will develop by the expansion of a connecting aquifer into the oil zone, as a result of the lowering of the pressure in the oil-saturated portion of the reservoir due to oil withdrawals. In that case the question will then be: Will the connecting aquifer be of sufficient size to develop an appreciable influence on the ultimate recovery of the oil in place?

Since expansibility factor of compressed water is slight for a given volume, the volume of the aquifer must be tremendous in comparison to the volume of the oil-bearing portion of the reservoir for a substantial increase in ultimate recovery of oil by primary means to result.

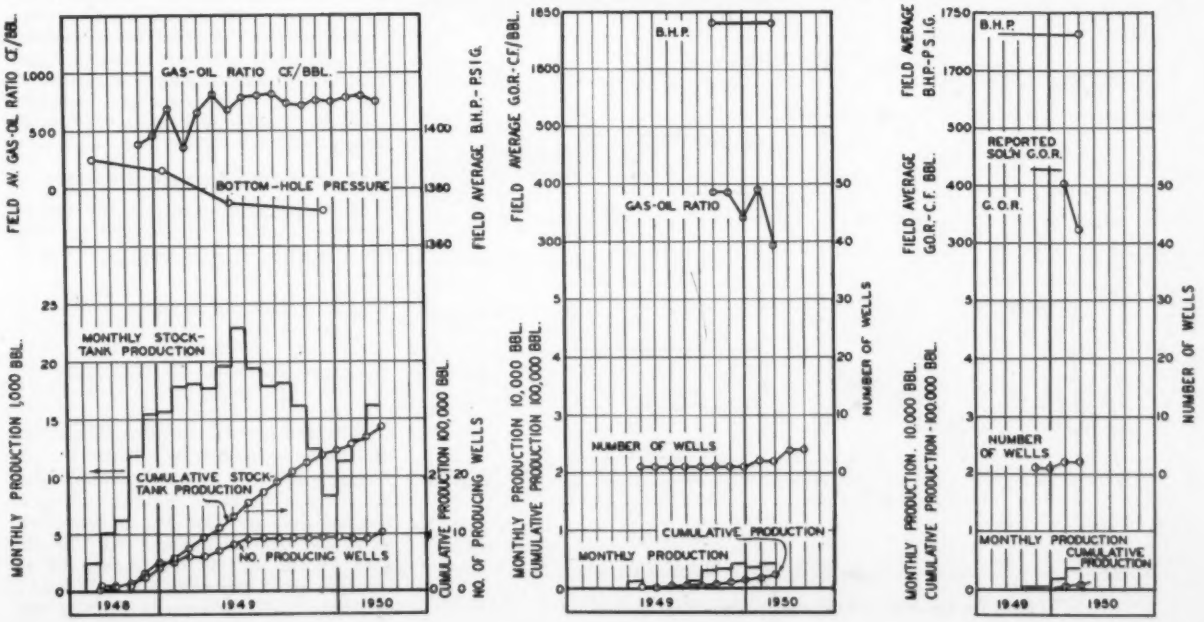
At least a partial answer to the size and behavior of the aquifer underlying the D-3 zone at Redwater may be developed in the coming months as a result of the establishment of a pressure-observation well 17 miles west of the center of the field by a group of Redwater operators. This pressure-observation well, Imperial Oil, Ltd., 1 Waybrook, LSD 4, 32-57-24w24, was originally drilled as wildcat, searching for a new field, but found only water.

Deep tests and dry holes at Redwater have established the fact that below the oil saturation there is about 900 to 1,000 ft. of well-connected reef porosity containing water. As shown by Fig. 1, the pressure-decline rate in Redwater's D-3 zone has been low, indicating that at least some water influx is taking place.

The Waybrook wildcat found the top of the reef about 90 ft. below the oil-water contact line in Redwater field. If depleting the Redwater oil reservoir, which has no gas cap and has undersaturated crude, allows the water below and flanking the oil to expand, some pressure gradient may be established which can be measured 17 miles away. At least that is the design of the operators who are joining in maintaining the unsuccessful Waybrook wildcat as a pressure-observation hole.

It has already been determined that the D-2 zone reservoir at Leduc does not have a large uniform aquifer underlying the oil so that the possibility of any appreciable water drive appears remote. However, in the D-3 zone reservoir there is a 600-ft. water zone underlying and connected with the oil zone so that water-drive action may play an important role in the reservoir, once the gas-cap pressure has declined appreciably. At Stettler, the ultimate recovery of oil from both the D-2 and the D-3 zones is expected to be dependent on the water drive developed by water expansion from the aquifers.

Fig. 4—(Left) Leduc-Woodbend Lower Cretaceous sand production. (Petroleum and Natural Gas Conservation Board data.) Ten wells in this field had produced a cumulative total of nearly 300,000 bbl. to April 1, 1950. Average bottom-hole pressure has declined from original 1,390 psig. to 1,365 psig. at end of 1949; later data not yet available. Gas-oil ratio has been fairly uniform over past few months at about 750 cu. ft. per barrel. Wells on pump, which reported no gas, were excluded in figuring gas-oil ratio. Efforts currently are being made to compile accurate and complete statistics on production of water from wells, including free water drained from tanks or treaters, as well as b.s.and w. occurring as an emulsion in crude. Fig. 5—(Center) D-3 reservoir in Stettler field (Petroleum and Natural Gas Conservation Board data). Original reservoir pressure was 1,836 psig. at datum of —2,600 ft. The crude is undersaturated in D-3 reservoir, pressure being 1,805 psig. Cumulative production to end of February 1950 was 21,065 bbl., with producing gas-oil ratio of about 375 cu. ft. Solution gas-oil ratio as determined from differential gas liberation on a subsurface sample was 420 cu. ft. per barrel of residual oil. Fig. 6—(Right) D-2 reservoir in Stettler field. (Petroleum and Natural Gas Conservation Board data.) Up to March 1, 1950, the cumulative D-2 production was 5,817 bbl. Original bottom-hole pressure was indicated by preliminary measurements to be about 1,730 psig. at —2,475 ft. Reported solution gas-oil ratio is about 430 cu. ft. per barrel on a residual-oil basis, and determined by differential liberation. Note that the measured gas-oil ratio has been very erratic and somewhat less than solution ratio during the 2 months for which gas production was reported.



The why, how, and dollars and sense of

WASTE-HEAT RECOVERY

This article illustrates same savings possible: (1) One furnace, efficiency improved, saves $9.52 per day; (2) one heat exchanger installed, $22.90; (3) one shell-and-tube steam superheater installed, $8.58; (4) one exhaust steam turbine installed, $38.40; (5) savings from proper steam traps, $10. Total savings, $89.40 per day, or $32,631.00 annually.

by L. D. Stewart*

WASTE-HEAT recovery, by definition, is self-explanatory in that it is the utilization of heat that would otherwise be wasted. A prevalent, but outdated notion is that the refinery power-process balance is of a secondary consideration and that a full-scale study is not often justified in an already designed and operating refinery. Such an attitude will undoubtedly reflect in higher production costs.

Heat-Recovery Methods

A simple list of methods of recovering waste heat, whether it be in initial design or in proposed operation changes, might be as follows:

1. Use low-pressure steam for heating or process where possible, in existing equipment.

2. Increase operating efficiency of furnaces and heaters by keeping the excess air to an operating minimum.

3. Install economical heat exchange to save cooling water and fuel:

(a) Between oil streams.

(b) With waste-heat boilers, utilizing hot oil or flue gases.

4. Utilize exhaust steam, with the addition of new equipment, as:

(a) Superheat, and use for process as in oil strippers.

(b) Use for power drives, as in low-pressure turbines.

(c) Use for refrigeration, in either of three methods.

(d) Heat boiler feed water, as with steam exhausting from pumps, noncondensing, or even low-pressure turbines.

(e) Condense the exhaust steam and return to condensate.

5. Reroute water streams:

(a) Use cold boiler feed water in plant condensers and coolers, where practical.

(b) Route semiheated cooling water from one unit effluent to another unit, before returning it to the cooling tower.

6. Miscellaneous and future developments:

(a) Determine the economical relation between the amount of steam and vacuum to use in a vacuum unit.

(b) Establish optimum thickness of insulation.

(c) Install properly designed steam traps on steam heaters, which will discharge only steam-free condensate.

(d) Develop centrifugal compressors to economically handle vapors at high discharge pressures, to avoid condensing and liquid pumping when transferring to another heated process.

The above list of methods, 1 through 5, will be discussed in detail hereinafter.

*Process engineer, Mid-Continent Petroleum Corp., Tulsa refinery. Paper presented at first annual process-heat seminar, John Zink Co., Tulsa.

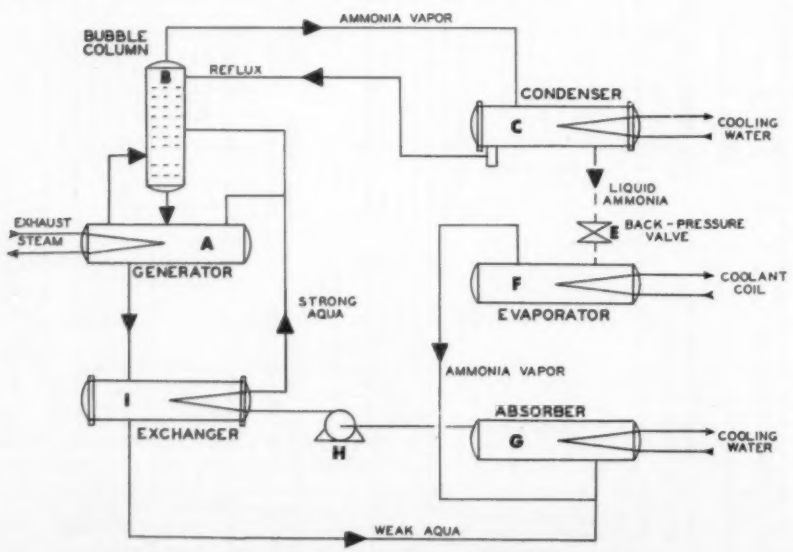


Fig. 1—Ammonia absorption refrigeration system.

1. Use of Low-Pressure Steam

An operator will often use high-pressure steam merely because it is convenient, where exhaust steam would suffice. A careful inspection throughout the refinery may reveal that high-pressure steam is often being used on steam heaters in tanks and processing where it is unnecessary.

2. Increased Furnace Efficiency

This operation requires no appreciable equipment investment. A few draft gages, a well-equipped Orsat, and the formula:

$$\text{Per cent excess air} = \frac{O_2}{(21/79\ N_2) - O_2} \times 100$$

will determine the furnace efficiency, and possible saving in fuel gas.

Example: A 50,000,000-B.t.u. per hour duty furnace, having a stack temperature of 750° F., is operating at 70 per cent efficiency with 75 per cent excess air. If the excess air is reduced to 32 per cent, the calculated efficiency will be increased to 75 per

cent (by use of John Zink Combustion Chart, or Nelson, Petroleum Refinery Engineering, Third Edition, page 367).

$$\text{Saving in B.t.u.'s liberated} = \frac{50{,}000{,}000}{.70} - \frac{50{,}000{,}000}{.75}$$

$$= 4{,}762{,}000 \text{ B.t.u. per hour.}$$

Value of 1,200 B.t.u./cu. ft. fuel gas, at 10 cents/M.c.f.

$$= \frac{4{,}762{,}000 \times 24 \times \$.1000}{1{,}200 \times 1{,}000}$$

$$= \$9.52 \text{ per day}$$

$$= \$3{,}332.00 \text{ per year per 50 M.M. furnace}$$

An increase over this saving can be attained on the furnace if proper burner and draft adjustments are made.

3(a) Heat Exchange Between Oil Streams

The net saving obtained by the recovery of waste heat is the value of the heat saved, less the cost of the equipment and the cost of operating. This net saving approaches a high limit for a given set of conditions, but decreases if any of the conditions are appreciably altered. It is therefore important to predict the best average operating conditions for economical design purposes.

An important element in the design of heat exchangers is the selection of the most economical "approach," or difference in temperature between the incoming cooling material and the outgoing heating material. This selection determines the surface versus the heat exchanged.

In general, heat is more valuable in proportion to surface, depending upon the payout time desired, but if a very low mean temperature difference is attained the cost of exchanger surface will soon offset this saving. In the basic exchanger equation:

$$\text{Surface, sq. ft.} = \frac{\text{B.t.u.'s exchanged}}{\text{M.T.D.} \times \text{transfer rate}}$$

the mean temperature difference and the over-all heat-transfer rate are both to the first power, so that lowering the mean temperature difference unduly, is exactly equivalent to having a low transfer rate, and the increase in surface requirements is proportional. This condition can easily get out of bounds in such units as solvent treating or dewaxing, where temperature levels are low but the heat to be transferred is great.

Finally, it is important to examine the over-all heat balance of the unit being studied, as well as the component parts. For example, if the oil entering the convection section of a pipe still has been heated by exchange to something over, say 400° F., the flue-gas temperature may be correspondingly increased to the extent that the saving in cooling surface and cooling water is more than lost in stack heat. The most economical heat-exchange may be determined by comparing the total cost of absorbing heat in the heaters and exchangers and removing it in the coolers.

Example of profit* from heat exchange:

Exchanger duty = 6,400,000 B.t.u. per hour

Mean temp. diff. = 92

Over-all transfer rate = 35

$$\text{Exchange surface, sq. ft.} = \frac{6{,}400{,}000}{92 \times 35}$$

$$= 1{,}990.$$

30° rise cooling water circulation saved, at \$.0060/M gal.

$$= \frac{6{,}400{,}000 \times 24 \times \$.0060}{30 \times 8.328 \times 1{,}000}$$

$$= \$3.70 \text{ per day.}$$

3 per cent makeup water saved, at \$.1168/M gal.

$$= \frac{18{,}432 \times \$.1168}{1{,}000} = \$2.15 \text{ per day.}$$

1,200 B.t.u./cu. ft. fuel gas saved, at \$.1000/M.c.f., and 75 per cent furnace efficiency

$$= \frac{6{,}400{,}000 \times 24 \times \$.1000}{.75 \times 1{,}200 \times 1{,}000}$$

$$= \$17.05 \text{ per day.}$$

Total saving = \$22.90 per day.

Cost of installed exchange, using finned tubes, at \$275.00

$$= 275 \times 20 = \$5{,}500.00.$$

$$\text{Payout time} = 5{,}500/22.90 = 240 \text{ days.}$$

*Operating and depreciation costs omitted, but these are offset by the increased savings derived from the release of the cooling tower to other duty, or in obtaining cooler water.

3(b) Waste Heat Boilers

Waste-heat steam boilers utilizing hot oil streams, slurries, or flue gases are now conventional equipment rather than the novelty of a few years ago. Typical examples include:

1. Flue-gas coolers on catalytic cracking units.
2. Catalyst-slurry coolers on catalytic cracking fractionating towers.
3. Waste-heat boilers using hot residual material from cracking.
4. Waste-heat boilers using tube still flue gases. The tubes for this operation may be located in the convection section of the furnace, or, by the use of induced draft circulation, in the breeching or adjacent to it.

Hicks[1] gives a good description of these operations. One refiner in Oklahoma[2] is generating 30 per cent of the total steam requirement in this way. It is preferable to produce the steam with some superheat (as by using finned tubes) so that it can be used directly. This affords better efficiency on turbines and results in less line loss than with saturated steam.

The quantities of 140-psia. steam, generated in fluid catalytic cracking units of various capacities, is somewhat as indicated in Table 1. The values are naturally very approximate, and vary with the carbon resi-

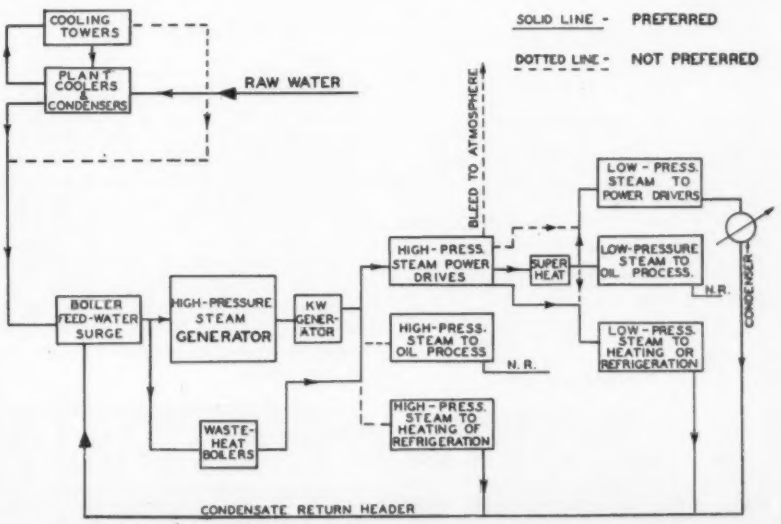


Fig. 2—Steam processing for waste heat recovery (N.R. = Steam not recoverable).

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due of the feed stock, conversion in the reactor, recycle ratio, and other factors such as the original exchanger surface design. The steam generated may be increased by about 25 per cent if catalyst recycle coolers are used.

TABLE 1—STEAM GENERATION IN FLUID CATALYTIC CRACKING UNITS

Oil charge to cat cracker, B.P.D.	Heat exchanged in waste-heat boilers, B.t.u./hr.	Lb./hr. 98% steam, 140 psia., from feed water
12,000	47,081,000	52,000
15,000	67,000,000	74,000
18,000	84,200,000	93,000
21,000	95,972,000	106,000

It may be argued that the equipment for generating the above steam is part of the process equipment, and would have been necessary for cooling streams whether steam was generated or not. On this basis it is incorrect to establish a utility savings and determine a payout on the separate parts, as the equipment payout would be included in the entire unit payout. The calculated saving is therefore realized strictly by comparison of the method of cooling, i.e., by water cooling or steam generation, assuming that the cooling could be done practically in either way and that the surface cost would be nearly identical in either case.

Example:

Using the 15,000-bbl. per day charge in Table 1, the total heat in question is 67,000,000 B.t.u. per hour, generating 74,000 lb. per hour of steam.* If this heat were removed by cooling water, the cost would be:

30° rise cooling water circulation cost at $.0060/M gal.

$$= \frac{67{,}000{,}000 \times 24 \times \$.006}{30 \times 8.328 \times 1{,}000}$$

$$= \$38.80 \text{ per day.}$$

3 per cent makeup water cost at $.1168/M gal.

$$= \frac{192{,}974 \times \$.1168}{1{,}000}$$

$$= \$22.54 \text{ per day.}$$

Total cost of cooling with water = $61.34 per day.

If the heat were removed by generating steam, the cost would be:

Cost of treated boiler feed water at $.1900/M gal.

$$= \frac{74{,}000 \times 24 \times \$.1900}{8.328 \times 1{,}000}$$

$$= \$40.00 \text{ per day.}$$

Cost of fuel gas for 100° of superheating at 136 psia. considered as integral with the generation of steam

$$= \frac{74{,}000 \times 74 \text{ B.t.u. per lb.} \times 24 \times \$.1000}{.65 \times 1{,}200 \times 1{,}000}$$

$$= \$16.85 \text{ per day.}$$

Total cost of cooling by steam generation = $59.35 per day.

Therefore, the cost of removing the heat from the process streams is practically identical whichever method is considered. However, in using the steam generation route, 74,000 lb. per hour of steam is produced for necessary use by the cracking unit at a cost of only $59.35 per day. If this steam were taken from the power plant, the cost would be:

Power-plant steam at $.2000/M lb.

$$= \frac{74{,}000 \times 24 \times \$.2000}{1{,}000}$$

$$= \$355.20 \text{ per day.}$$

This high value is of course due to the cost of heat and its diversion into steam. In the waste-heat boilers the heat was "free," and this, then, is the substance of waste-heat recovery.

4(a) Superheating Exhaust Steam

Several refinery processes require the use of stripping steam, the physical action being that of partial pressure reduction by having sufficient mols of steam present. No heating requirement is expected, although the steam should be sufficiently superheated to prevent self-condensation before reaching the overhead condenser. Under these conditions, and since the steam usually ends up in the sewer line rather than the condensate return, low-pressure exhaust steam should be used for all stripping where possible, rather than the more expensive high-pressure steam. The exhaust steam may be superheated in a direct-fired heater, or where small quantities are involved, it may be superheated with live steam in a shell-and-tube exchanger.

Example:

100 mols of stripping steam per hour is required at 5.5 psia. and 368° F. This is to be obtained by superheating exhaust steam from 250° F. and 30 psia., to 368° F. and 5.5 psia. The enthalpy requirement from the steam tables is 64 B.t.u. per pound, or a total duty of 11,500 B.t.u. per hour.

The live steam is at a pressure of 154 psia. (423° F.) and will be lowered to 360° F. and condensed. The enthalpy released will be 895 B.t.u. per pound, and the live-steam requirement is therefore 11,500/895 = 12.8 lb. per hour.

Value of live steam if used for **stripping**, at $.2000/M lb.

$$= \frac{1{,}800 \times 24 \times \$.2000}{1{,}000}$$

$$= \$8.64 \text{ per day.}$$

Cost of live steam, if used for superheating exhaust steam

$$= \frac{12.8 \times 24 \times \$.2000}{1{,}000}$$

$$= \$.0615 \text{ per day.}$$

Saving, assuming that the exhaust steam could not have been used otherwise

= $8.58 per day.

If the exhaust steam could have been condensed and returned to condensate had it not been used for stripping, its value would be:

Value of condensate, at $.0220/M lb.

$$= \frac{1{,}800 \times 24 \times \$.0220}{1{,}000}$$

$$= \$.9500$$

and the saving would be $7.63 per day rather than $8.58.

After determining the heat-exchange cost for such an installation the payout time is easily determined as in previous examples.

Since steam is generally more expensive than fuels, a more economical procedure on a large superheater duty is the use of a direct-fired superheater. One example of this is the Petro-Chem Iso-Flow direct-fired heater. Table 2 indicates the relative cost of the smaller size units, and using cost indexes for labor, such as the "Costimating"" series recently published, a payout time can be estimated. The prices in Table 2 are based on all-welded Schedule 80 carbon steel coils with welded return bends. These units are the all-radiant type, and efficiencies are 60-65 per cent.

TABLE 2—RELATIVE COST OF PETRO-CHEM ISO-FLOW FURNACES

Duty, thous. B.t.u.	Price, dollars
100	1,950
150	2,050
200	2,150
250	2,250
525	2,750
1,000	3,450
1,500	3,700
2,000	4,400
2,500	4,950
3,000	5,650
3,750	6,300
4,000	6,450
4,500	7,200
6,000	8,900

A few trial calculations with plotting will indicate when to superheat with live steam or with direct firing. Another common method of superheating steam is to install tubes in the box of a nearby furnace. In any case, an attempt should be made to avoid expanding live steam down to a low pressure for process operations, without making use of the available work in doing so.

4(b) Exhaust Steam in Low-Pressure Turbines

Consideration of thermodynamic principles indicates that a greater ef-

*Boiler blowdown should be considered for greater accuracy.

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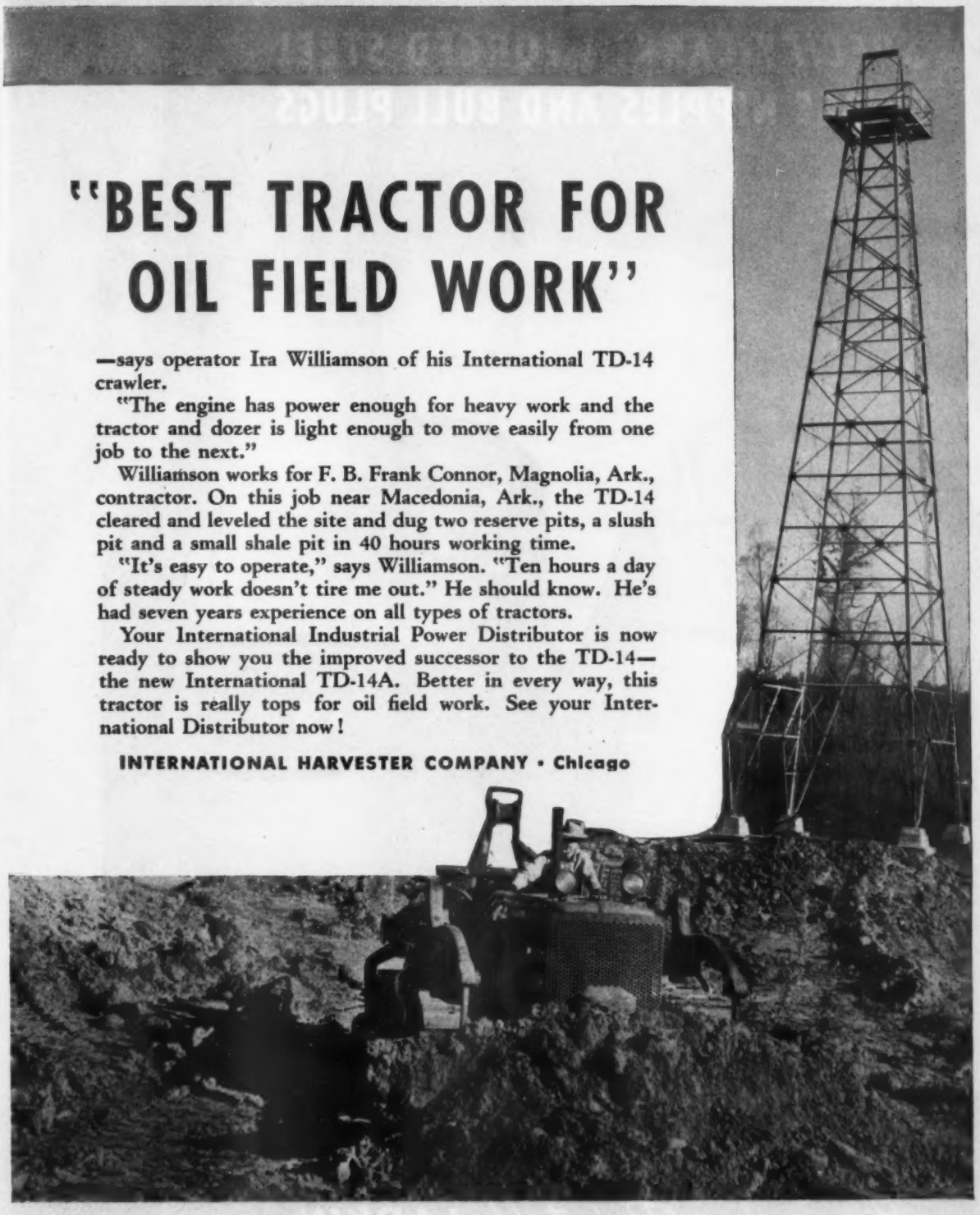

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TABLE 3—COMPARISON OF AVAILABLE HEAT FROM EXPANDING STEAM

Steam pressure drop, psi.	B.t.u.'s available	Theoretical steam required	Steam rate, based on 50% eff.
From 140 to 20	120	21.2	42.4
From 140 to 0	178	14.3	28.6
From 140 to 1.5*	310	8.2	16.4
From 20 to 0	58	43.9	87.8
From 20 to 1.5*	190	13.4	26.8
From 0 to 1.5*	132	19.3	38.6

*Absolute.

ficiency of any heat-power cycle may be secured by increasing the temperature range through which the cycle is operated. With pumps, this principle is more applicable to reciprocating equipment than to turbines. The reciprocating steam engine utilizes more of the available energy of the steam at high pressure than at low pressure. The turbine, on the other hand, has an advantage at low pressure, or where the ratios of expansion are large, since it operates on a complete expansion cycle. In many cases, therefore, the thermal economy of pumping plants can be improved by installing low-pressure steam turbines (particularly condensing) to utilize the exhaust steam from reciprocating equipment.

About the same amount of energy is available for doing work in expanding from a medium boiler pressure down to that of the atmosphere, as there is in expanding from atmospheric pressure to that of a high vacuum. However, the expansion is much larger in the second case, and to utilize this expansion, the steam cylinder must be correspondingly larger. Efficiency is not greatly altered for the same horsepower.

To illustrate, following is a tabulation of the enthalpies from the Mollier diagram of steam expanded at constant entropy from an initial pressure of 140 psig. with 60° F. superheat, to several different terminal pressures.

Pressure	Enthalpy
140 psig.	1,230 B.t.u./lb.
20 psig	1,110 B.t.u./lb.
0 psig.	1,052 B.t.u./lb.
1.5 psia.	920 B.t.u./lb.

By subtracting the enthalpies between two levels and dividing into the B.t.u. - horsepower equivalent, 2,545, the theoretical steam requirement per horsepower-hour is obtained. The steam rate, or pounds of steam per hour per **horsepower output** (brake horsepower) is then obtained by dividing the theoretical steam by the turbine efficiency. Since efficiency is a function of horsepower rating, and several other factors, a true evaluation will not be made here; but using a 50 per cent efficiency, the steam rates for different expansions are shown in Table 3.

The last two items of Table 3 are illustrative that wherever exhaust steam is discharging to the atmosphere at any pressure above zero it could advisedly be directed to an exhaust steam turbine, condensing. For single installations, a barometric condenser will probably be found the most economical, even though the condensate ends up in the cooling-water system. A surface condenser is of course justified for larger duties, especially if located centrally to a number of units. Low-pressure turbines, or equipment for revamping high-pressure turbines to low pressure are readily obtainable at nominal prices.

Pump-end calculations are of course as commonly used. Conversion of head from feet of water to pounds per square inch, or vice versa, is sometimes troublesome. The head, in pounds per square inch pressure = (feet × sp. gr.)/2.31, but the head, in feet of water = pounds per square inch × 2.31.

4(c) Use of Exhaust Steam for Refrigeration

Purpose of a refrigeration system is to transfer heat from a low-temperature to a high-temperature environment. Since the required heat flow is in the opposite direction to the natural tendency, work is required to perform the operation. In a vaporization machine, this is done by causing a volatile liquid to absorb heat at the low temperature by vaporization (pressure maintained lower than saturation pressure at the vaporizer temperature), and to dissipate this heat at the high temperature by condensation (pressure held higher than saturation pressure at the condenser temperature). Thus an evaporator, condenser and some means of transferring the refrigerant are common equipment to any type of vaporization refrigeration machine.

The three common types of refrigeration machines are compression, vacuum, and absorption. In the vapor compression system, the refrigerant is transferred by a compressor driven by a mechanical prime mover. In the water vapor-steam jet system, the refrigerant is pressurized by pressured steam in steam jets. In the absorption system the prime mover is foreign heat. Each of these systems can utilize exhaust steam if desired, rather than high-pressure steam. With the compression system, a low-pressure turbine and centrifugal compressor with multiple stages is required to obtain the necessary pressure requirement. Large-size nozzles or jets are required in the water-vapor equipment, if exhaust steam is to be used.

The thermodynamics necessary to design any of these types of refrigeration units may be found in a good mechanical or refrigeration handbook. The use of Stickney charts facilitates the computations in the case of the absorption system. Operating economy is derived from the work ratio, or performance coefficient, i.e., the ratio of the net heat abstracted to the work expended. The horsepower and kilowatts required per ton of refrigeration follow directly from this definition of work ratio, and the conversion factors:

$$1 \text{ hp.} = 2{,}545 \text{ B.t.u./hr.}$$

$$1 \text{ kw.} = 3{,}415 \text{ B.t.u./hr.}$$

$$1 \text{ ton of refrigeration} = 12{,}000 \text{ B.t.u./hr.}$$

$$\text{Theoretical horsepower/ton} = \frac{12{,}000}{2{,}545 \times \text{work ratio}}$$

The theoretical horsepower is nearly equal to the indicated horsepower, but the brake horsepower will be 10 to 20 per cent higher due to friction, inertia, and other losses. For example, at an 85° F. condenser temperature (153 psig.) and 0° F. evaporator temperature (16 psig.), 1 hp. is required to produce 1 ton of refrigeration with ammonia. Economies may be ascertained similarly to that of the turbine study and Table 3 when using steam. The latent heat of the steam is lost to cooling water in the compression system, but is recovered for refrigeration in the absorption system. Since the latter is easily adapted to the use of exhaust steam for low-temperature refrigeration, a further discussion seems pertinent.

The continuous absorption system has undergone considerable improvement in recent years and probably merits a closer consideration than it normally obtains. This is particularly true in a waste-heat study. The tendency of refiners is to "grab" a gas-engine compressor for refrigeration because it is convenient. The new design absorption units have eliminated the analyzer and dehumidifier for purifying the ammonia, by using liquid ammonia reflux and fractionation in the bubble column. Weak aqua coolers are usually not necessary, through better exchanger design with the strong aqua, and absorber efficiencies have been greatly improved. Most published flow diagrams in texts and handbooks show designs of the years from 1870 to 1910.

The absorption system is based on the ability of water to absorb large quantities of refrigerant, usually ammonia, which can be released by the application of heat. The absorber compares to the suction stroke of a compressor in withdrawing vapor from the evaporator. The liquid transfer pump and generator compare to the discharge of a compressor in supplying pressure to the condenser. A block flow diagram of an ammonia absorption system is shown in Fig. 1.

The refrigerant is drawn from the evaporator (expansion) coils F at a

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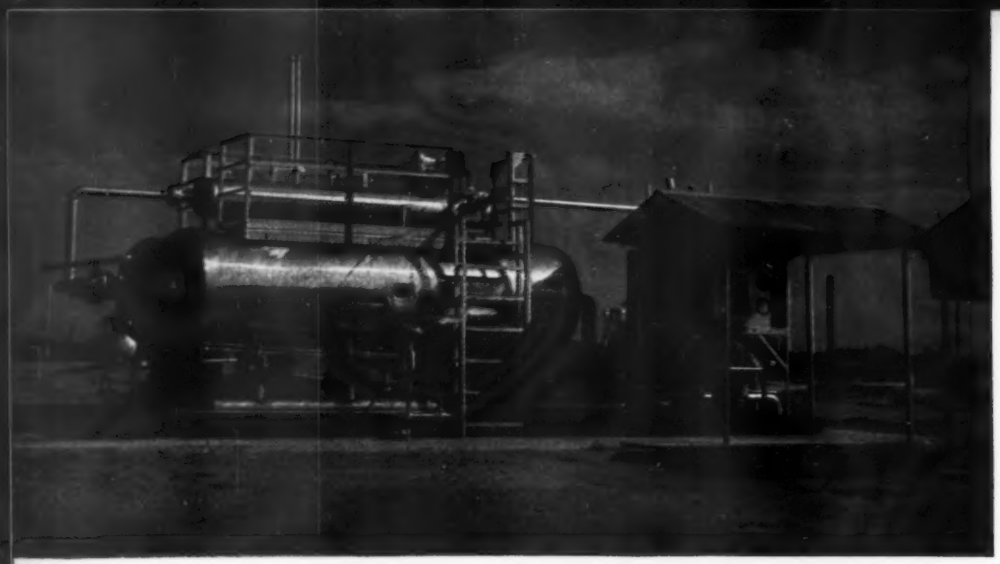

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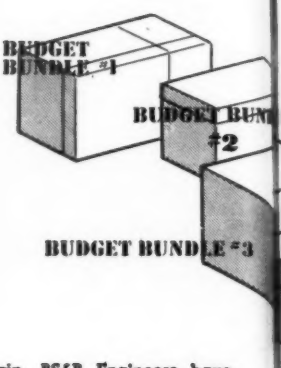

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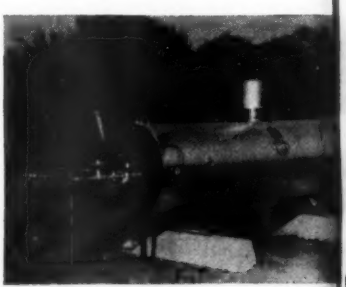

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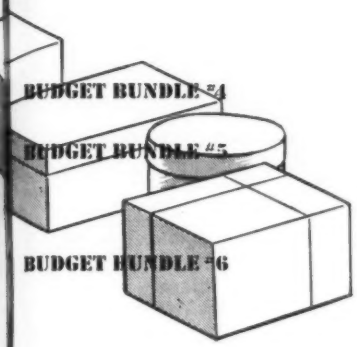

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given pressure p_1 and dissolved in the absorber G where the combined pressure of solvent (ammonia-water) and refrigerant must be less than p_1. The refrigerant is recovered by applying heat to the generator A; separated in anhydrous form by the bubble column B; liquefied in the condenser C; collected in a liquid receiver D (not shown); and returned to the expansion coils F through expansion valve E.

Since the absorber is at a lower pressure than the generator, it is necessary to insert between them a pump H to transfer the strong aqua. Only part of the ammonia (about 8 per cent) is removed from the strong aqua, and the weak aqua solution is returned to the absorber through the heat exchanger I. Heat of solution and latent heat of liquefaction is evolved in the absorber, and must be removed to keep the pressure in the absorber lower than in the evaporator.

As example performance of the ammonia absorption system, using 250° F. exhaust steam and at an evaporator temperature of 30° F., a work ratio of 50 per cent may be obtained on a straight absorption cycle. On a resorption cycle, where two operating pressures and absorbers are used, a lower temperature level on the exhaust steam may be utilized (approximately 210° F.) but the work ratio would only be about 18 per cent, with 85° F. cooling water.

Installations are somewhat bulky (although greatly reduced in the new automatically controlled designs) but where waste heat is available, economies over mechanical refrigeration may be obtained. Comparative installation costs are indicated in Table 4, illustrating that absorption-type units have an advantage over compression units at low suction pressure and/or large tonnage. A certain large 3,450-ton absorption-type installation, using exhaust steam, is reported to have cost 70 per cent of what the same tonnage would have cost with compression-type refrigeration.

An interesting development in absorption refrigeration is that of using water vapor as the refrigerant and an inorganic salt (lithium bromide) as the absorbent. Since the high-boiling salt does not vaporize, there is no absorbent carryover into the condenser. Efficiency is increased since no heat is lost for re-evaporation of the absorbent. Steam pressure as low as 10 psi. may be used.[4]

To make a decision as to which of these types of refrigeration is the most economical a separate study is required for each locality with consideration given for utility availability and cost. An absorption unit, for example, would show particular advantage where waste heat and/or inexpensive cooling water are available. One refrigeration authority[5] has stated that "most refiners could obtain their entire refrigeration requirements

(Continued on page 89)

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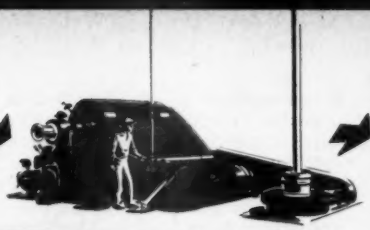

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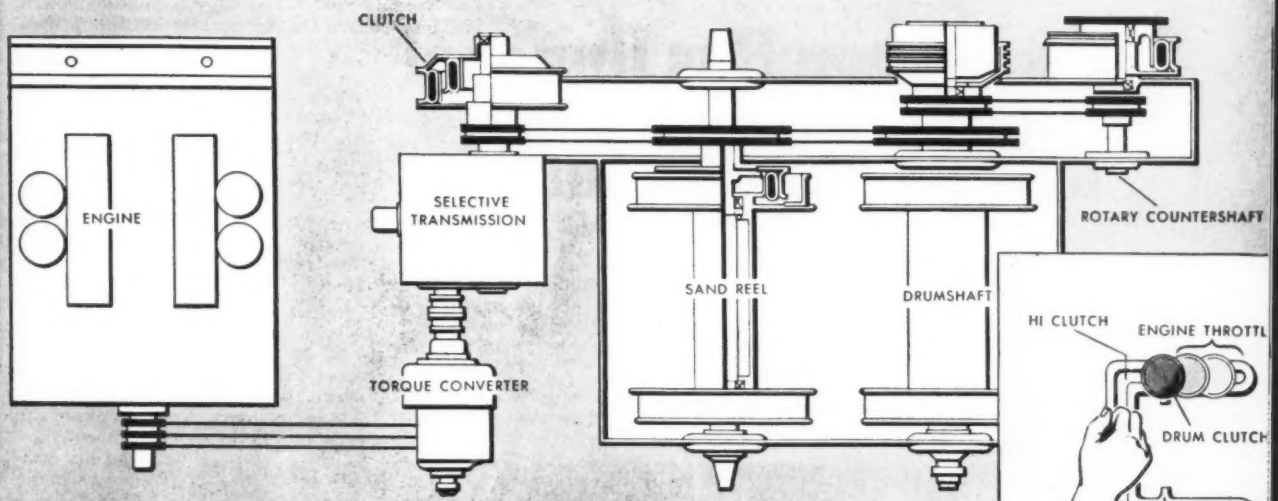

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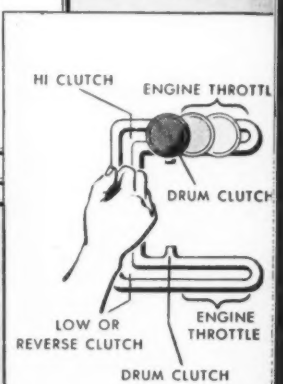

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NEW BULLETIN—New Emsco Bulletin F-175 gives complete information on the new Emsco GA-250-T Drilling Rig. Copies available upon request.

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H. M. McClain, consulting petroleum engineer, Dallas, uses microphone of U. S. Bureau of Mines public-address car to explain unique features of Cox & Hamon water flood to 300 members of Kansas-Oklahoma Water Flood Operators group who recently visited project. McClain, for many years in charge of secondary-recovery operations for Magnolia Petroleum Co., engineered this flood project as consultant for Cox & Hamon.

by J. C. Joers,* P. Grandone,* and D. B. Taliaferro*

Pilot Water Flood of Cox & Hamon Has Unusual Layout of Equipment

COX & HAMON, Dallas, began water injection on a pilot project in 16-26-18, in Allen County, Kansas, about a mile south of Humboldt, near the middle of January 1950. Although the present development covers only approximately 20 acres, it is on a unitized block of about 500 acres, which includes parts of 15, 16, 21, and 22-26-18e.

The entire block will be developed after experience has been acquired from the pilot project. Production is from the Bartlesville sand, which occurs in this area at a depth of 875 ft. The oil produced has a gravity of 34° A.P.I. No information is available on the history of the property prior to flooding.

*Petroleum Experiment Station, U. S. Bureau of Mines, Bartlesville. Report prepared as part of annual inspection tour of properties, Kansas-Oklahoma Water - Flood Operators Group.

Source and Treatment of Water

Brine from one supply well drilled into the Mississippi limestone at a depth of 1,200 ft. is used for flooding. This well is completed with 7-in. casing, and water is pumped from it through 2½-in. plastic-lined tubing directly to the input wells by a small submerged electrical centrifugal pump (Reda).

Return water separated at the tank battery is admitted into the casing head of the supply well, where it mixes with the Mississippi-lime water before being pumped into the injection system. As the closed-type

UNIQUE "PRESSURE PLANT."—(Left) This really is a water-supply well (producing from Mississippi lime, 1,200 ft.). But it also serves as a "pressure plant" (current output for the pilot flood project is 200 bbl. per day at 600 psi.). Pump is a submersible electric centrifugal unit; power conduit is seen at right. Water-output line leads away to upper right, to field injection system. Produced water from oil wells is passed through meter at left, then "dumped" to supply well where it mixes with newly produced water, and is pumped out to field injection lines. UNIQUE "CENTRAL POWER."—(Right) This is first application of hydraulic pumping to water-flood operation; the unit shown is the electrically powered triplex pump which supplies "power oil" to individual bottom-hole hydraulic pumps in each oil well.

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BECAUSE . . . MISSION design is simple and rugged throughout. No delicate parts or adjustments. All members are heavy and generous in size. Bearings are heavy-duty, fully enclosed, protected from dirt and salt water.

BECAUSE . . . replacement of any part can be quickly made in the field by unskilled personnel. Spare parts are quickly available.

And here are some vital ***intangible*** benefits that go with MISSION Salt Water Pumps: MISSION'S ***long experience*** in building practical equipment for the oil field . . . MISSION'S ***full appreciation*** of oil field operating problems . . . MISSION'S long established policy of seeing that every customer receives the economical, trouble-free service ***guaranteed*** with every MISSION product.

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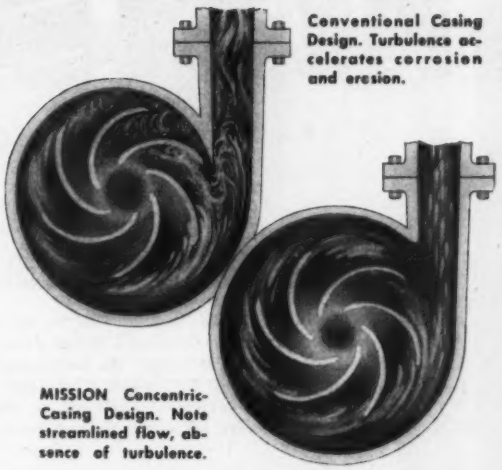
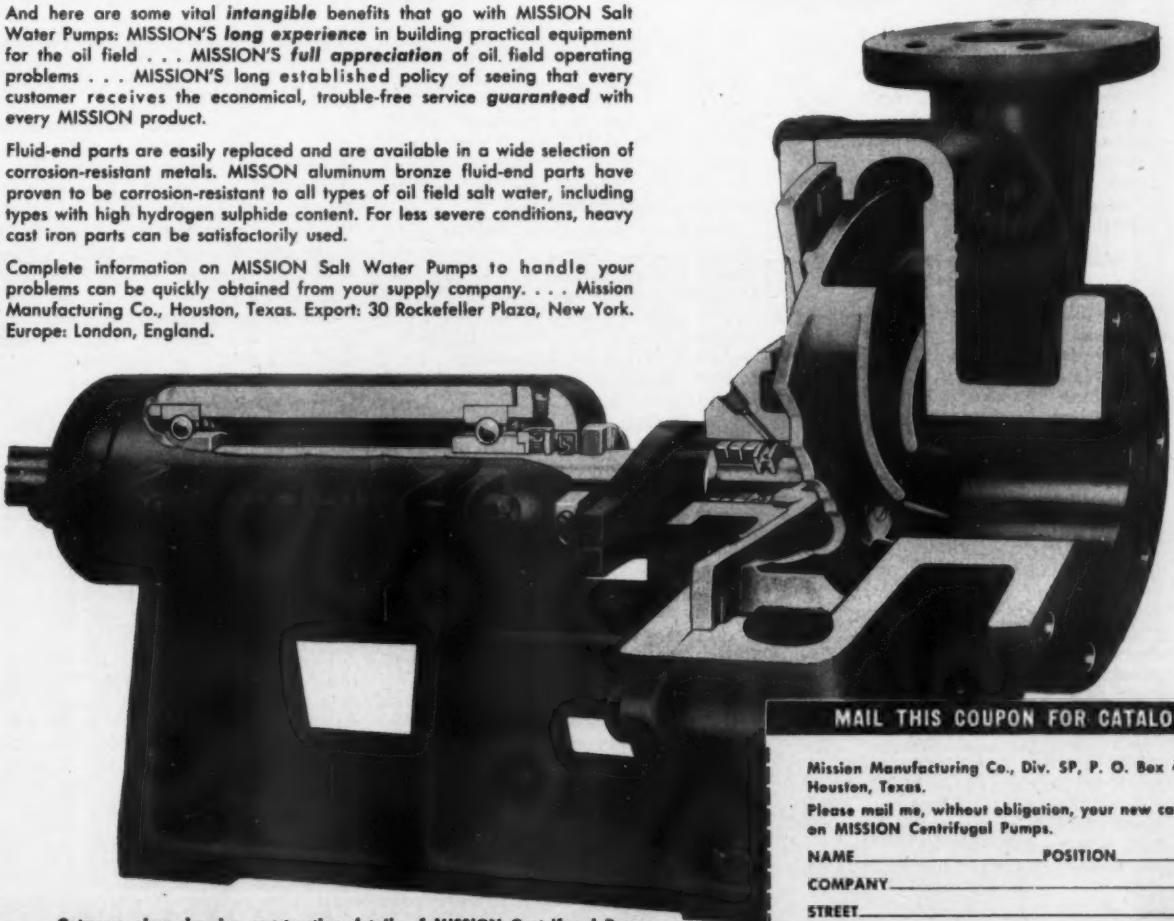


Conventional Casing Design. Turbulence accelerates corrosion and erosion.

MISSION Concentric-Casing Design. Note streamlined flow, absence of turbulence.



Cutaway view showing construction details of MISSION Centrifugal Pump.

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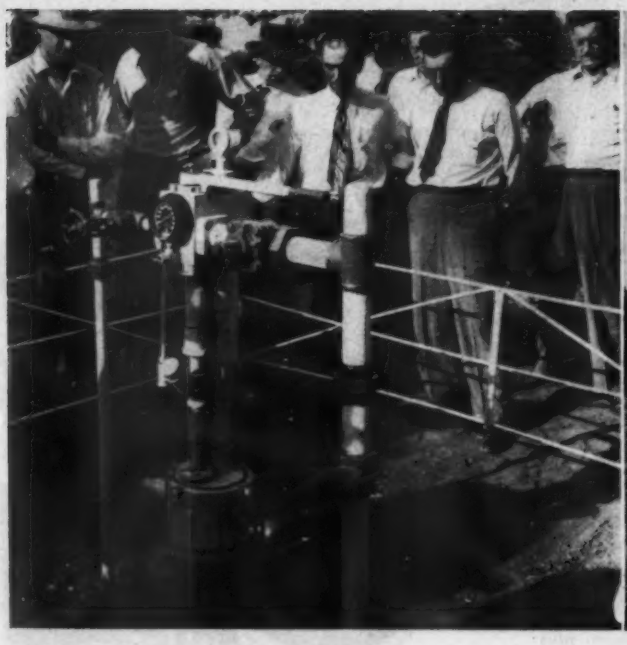

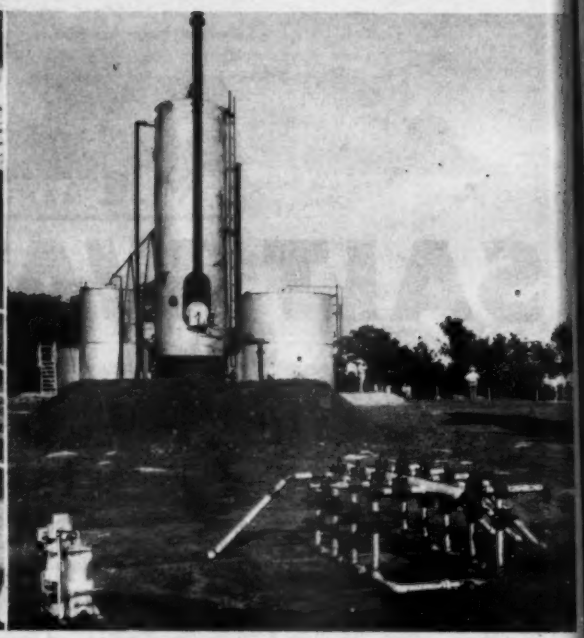

UNIQUE "PRODUCING WELL."—(Left) That is, as water-flood operations go, because this is the first application to such service, and some of the visiting Kansas-Oklahoma Water Flood Operators take a good look. This installation is the "free pump" type, and all that is necessary to "pull" or "rerun" the bottom-hole pump unit is to turn a well-head valve, and the pump comes to the surface or is returned to bottom. UNIQUE CRUDE-OIL HANDLING.—(Right) Production comes into individual well manifold or header, seen in right foreground. Production from individual wells can be measured by the liquid meter, left foreground, which is equipped with a water sampling device. From header, oil passes through heater-treater (center), into a high 200-bbl. settling tank via "boot," then to the two 250-bbl. tanks for storage.

system is used, no chemical treatment or filtering is applied to the raw water. During April 1950, the submerged pump was delivering about 200 bbl. of water per day at a line pressure of 600 psi.—the capacity of the pump at this pressure. No additional pumping equipment therefore is needed on the surface for water injection.

Water-Flood Development and Operation

The pilot project includes four new oil wells and four new water-injection wells. These are located so as to permit a five-spot development with a spacing of 880 ft. between like wells, but their arrangement does not provide a complete five-spot pattern. Three old oil wells in the vicinity of the new development are pumped by a central power.

The well-completion practice has been to drill through the sand, complete the wells without shooting, and case only the producing wells, using 5½-in. casing, which is cemented at the top of the sand. One joint of 8-in. surface pipe is used in each producing well. Input wells are equipped with 2½-in. plastic-lined tubing cemented at the top of tne sand.

The project is of particular interest because of the novel use of "free type" subsurface hydraulic pumping equipment (Kobe) in the producing wells. This equipment, which is designed for much deeper production, is being used for the first time to pump shallow (875 ft.) production. Also, it is the first installation on a water-flooding project. Pumping is entirely automatic and can be continued indefinitely, even if the wells are under water, unless a mechanical failure or an interruption in the electric power supply occurred.

The Kobe pump is a reciprocating, double-acting type that rests in the lower end of the 2-in. tubing near the bottom of the well and is actuated by oil that is forced down from the surface. The oil that drives the pump is forced down the 2-in. tubing by a triplex pump, which is placed centrally on the lease.

As the "power" oil discharges from the power cylinder of the pump, it enters the intake side of the pump with the formation oil, and the mixture is pumped to the surface through a 1-in. string of tubing lying alongside the 2-in. tubing of the well.

The pump may readily be raised to the top of the tubing for inspection, merely by reversing the circulation of the power oil. The triplex pump driving the power oil has adequate capacity to provide power to pump a total of 480 bbl. of liquid daily from the producing wells. This capacity may be divided among any number of wells.

During warm weather the wells are pumped during alternate 4-hour periods, but during cold weather they are pumped continuously to prevent freezing of lines leading to the tank battery. Intermittent pumping is controlled automatically by electric time clocks. The fluid level in the wells is kept low at all times.

Produced oil from the wells passes to a header, which is equipped to permit production measurement on individual wells with a Bowser meter. From the header the oil passes through a heat treater, thence into a high 200-bbl. settling tank through a "boot," in which the water and oil are separated.

Oil from the settling tank flows into two low 250-bbl. tanks for storage. A 500-bbl. tank is connected to the settling tank and "floats" in the system to provide storage for power oil to operate the Kobe pumps in the individual wells.

Water from the treater and the settling tank passes into a low 250-bbl. tank, from which it flows through a meter into the casing head of the water-supply well. A small centrifugal pump installed at the tank battery is connected so that tank bottoms may be pumped from any of the tanks back into the treater.

Water-injection wells are equipped individually with meters. The input rate in each of the four wells during April 1950 was about 50 bbl. of water per day, but the operator intends to increase this slightly by installing a larger pumping unit in the supply well. It is estimated that 8 months will be required to fill the sand at the present rate of water injection.

All lines on the pilot operation are

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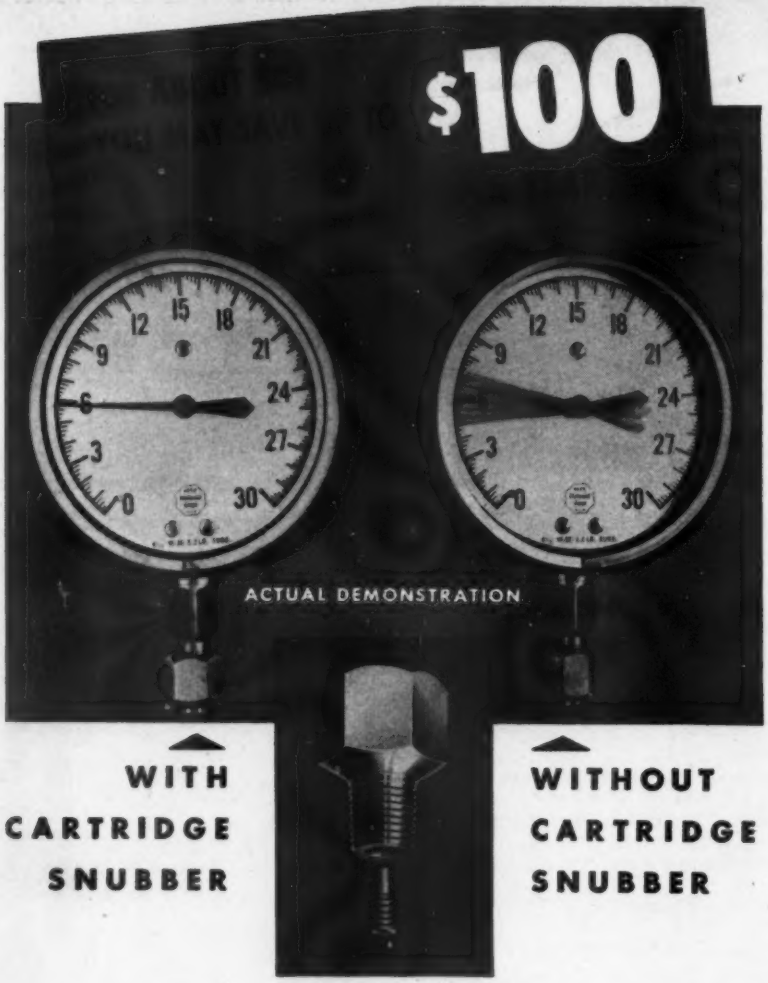

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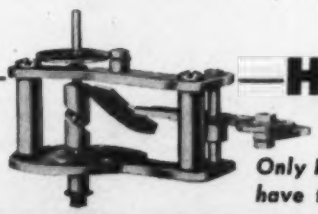

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laid on the surface of the ground without protection from the weather to determine if the expense of burying lines can be avoided. Experience last winter with the surface lines was that no freezing occurred at temperatures down to 10°F. and that by increasing the flow of power oil no freezing occurred down to 0° F.

Results of Flooding

The 20-acre pilot flood of Cox & Hamon is an experimental operation in many respects, and it has not been in operation long enough to obtain significant results on the experimental features or on the oil recovery that may be obtained. The novel use of Kobe pumps in the producing wells will make it possible to operate the project continuously regardless of high water from the Neosho River, which sometimes covers parts of the leases in the unitized tract. The hydraulic means of lifting the pump to the surface for repair will eliminate the cost of rod and tubing-pulling jobs, which are necessary to repair the more commonly used pumping equipment.

The maintenance of low liquid levels in the oil wells during the early life of the project is an especially desirable feature for the operator. Through this initial installation of Kobe pumping equipment the operator will determine (1) the feasibility of using this equipment economically in shallow wells, (2) the ability of the equipment to pump salt water, (3) the ability of the equipment to operate when the well heads are under water, (4) flexibility of the units over a wide range of rates during the life of the flood, (5) ability of the equipment to maintain low liquid levels in the producing wells, and (6) the extent to which tubing-pulling jobs will be eliminated.

The existing wells were producing 3 bbl. of oil daily before the new wells were drilled. In April 1950 the daily rate of production was 13 bbl. of oil and 20 bbl. of water.

BOOKS

MOTOR OILS AND ENGINE LUBRICATION. By Carl W. Georgi. Published by Reinhold Publishing Corp., 330 West 42nd Street, New York 18. $8.50.

The practical problems of engine usage, maintenance, and lubrication, as well as causes and remedies affecting operating troubles, are described in this volume. It covers at length the methods of testing and evaluating performance characteristics of motor oils. Particular emphasis is laid upon viscosity index and its importance in all phases of motor lubrication. An unusual feature of the book is the inclusion of detailed specifications covering various types of engine tests, properties of lubricants, and all types of performance ratings. Also included are chapters devoted to the refining and manufacture of motor oils and description of their chemical and physical properties. The author of the book is technical director of Quaker State Oil Refining Corp.'s research laboratories.

Simple, Rapid Method of Producing

Thermocouple Junctions

employs inexpensive equipment which is readily available in refineries

by Karl F. Hager,* Morris Rosenthal,† and Werner Ross†

REFINERY instrument men are frequently plagued by the necessity of replacing burned-out or otherwise damaged thermocouples in much of the equipment where temperature control is essential. In these cases the methods usually employed to join thermocouple junctions are either spot-welding or silver-soldering the ends of the two wires. These methods have disadvantages as follows:

1. Requirement of a certain degree of operating skill to produce satisfactory junctions.
2. Time element involved.
3. Difficulty of obtaining minute junctions with a sufficient degree of accuracy.
4. Difficulty in avoiding charring of insulation near the junction.

A new simple method of producing thermocouple junctions accurately with a minimum amount of time and skill is a variation of the spot-welding principle where the heat generated between two electrodes is sufficient to melt, fuse, and weld the metal pieces at the point of application of the electrodes.

In the process described here welding is accomplished by heat from an arc formed at the moment of contact between the thermocouple junction to be welded and an oil-covered mercury surface. The mercury and the thermocouple wires are connected to opposite poles of a source of current, as shown in Fig. 1.

The setup employs inexpensive equipment readily available to the user (see Fig. 2). The circuit is simple and can be assembled quickly. To one lead from a source of electrical supply is hooked an iron or steel cup containing mercury to a depth of a few centimeters under a layer of a clear, water-white oil 1 or 2 centimeters deep. In series with this container are connected a variable resistor of about 25 ohms and single-pole, single-throw toggle switch. To other lead from the source of current an alligator clamp is connected so that the thermocouple wires can be quickly mounted in the circuit. It is important that the leads be properly insulated. A safety shield or goggles

*Ordnance Research and Development Division, Fort Bliss, Tex. †General Electric Co., Fort Bliss, Tex.

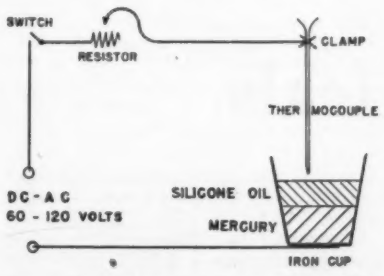


Fig. 1—Equipment and wiring arrangement.

Fig. 2—(Right) Operator is ready to weld thermocouple junctions.

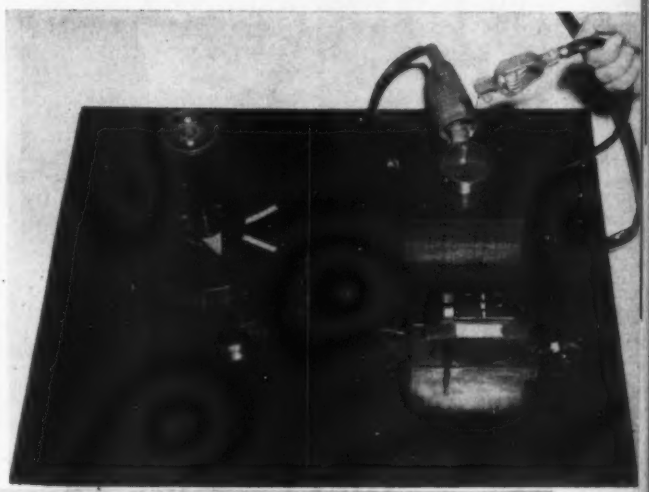
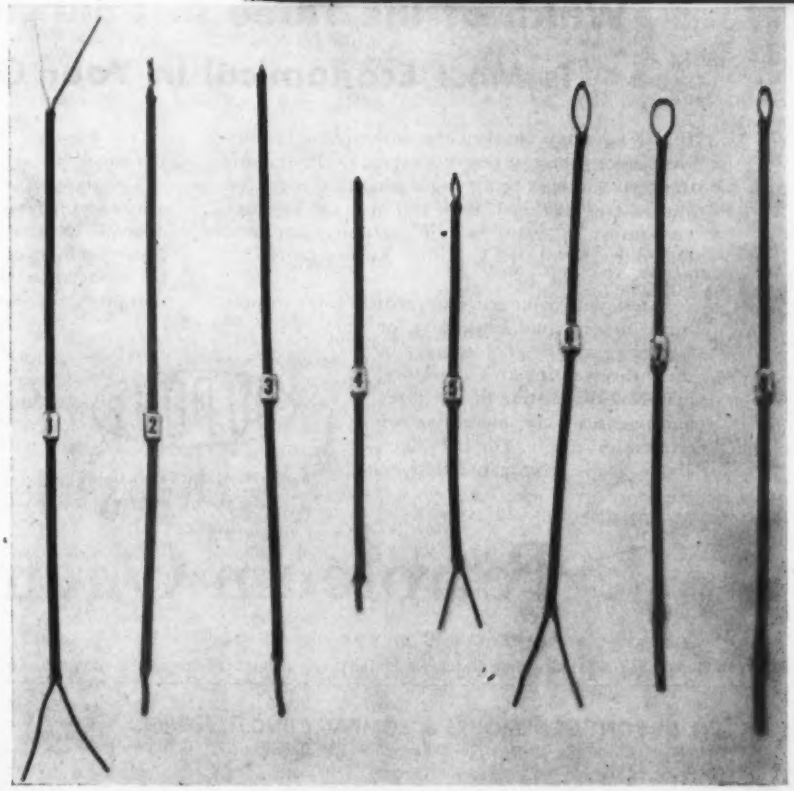


Fig. 3—(Below) Steps in the preparation of thermocouple wires for welding shown by wires 1, 2, 3, and 4. Different types of thermocouple junctions shown by wires 4, 5, 6, 7, and 8.



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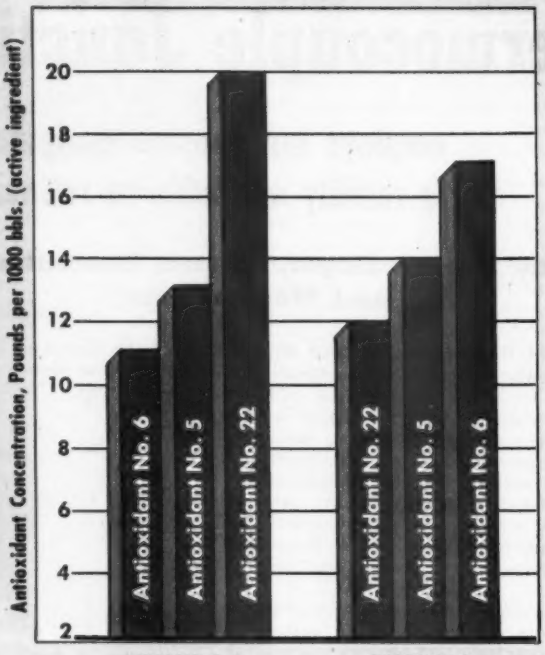

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should be worn during the welding process.

The method of obtaining the desired weld is as follows:

1. Preparation of wires.—Insulation is removed from the thermocouple wires to the exact distance desired. The wires are then twisted together to the shape of the junction desired, and the excess wire is cut away. In Fig. 3, wires 1, 2, and 3 illustrate the steps in the preparation of one type of thermocouple junction for welding. The object is to join the wires at the junction point by means of a ball of fused metal as small as possible without sacrificing the strength of the joint.

2. Welding procedure.—Connect the thermocouple wires to the source of electric supply by means of the alligator clamp, throw the switch to the "on" position, and slowly dip the thermocouple junction through the clear layer of oil on top of the mercury until contact is established as shown by a bright blue flash which can be observed readily through the water-white liquid. A bubbling noise similar to that produced by the rapid addition of concentrated sulfuric acid to water accompanies the flash. The contact is maintained for a fraction of a second, the exact length of time depending on the dimensions and the composition of the wires. Wires 4, 5, 6, 7, and 8, in Fig. 3 illustrate the different types of junctions that have been made employing this method.

The very small ball of fused metal produced reduces the possibility of local currents of any considerable magnitude to flow with consequent reduction of the effective voltage output of the thermocouple and decreased sensitivity. This method also eliminates the introduction of foreign metals with the same adverse effects.

Several variables which affect the length of contact time between the mercury and the thermocouple are:

1. Available wattage.—The greater the amount of current available, the less the contact time required. Too high a concentration of watts at the point of contact will cause burning of the metal; too low a wattage will not effect a weld.

2. Dimensions of the wire. — The longer or thicker the wire the longer the contact period must be.

3. Composition and resistance of the wire.—The higher the resistance the longer the time of contact. Each alloy or wire material must be handled differently in this respect. A few trials will soon determine the length of contact required to obtain a proper weld.

The variable resistance is decreased as the resistance of the wires to be welded increases. Proper regulation of series resistance and proper contact time is especially important when using cooper-constantan thermocouples since there is a wide discrepancy between the melting points of the two wires. Too brittle a connection results unless a previous experimentation is made.

As an example of the variables encountered it may be mentioned that a 20-gage iron-constantan thermocouple was found to have a resistance of 0.3 ohms per linear foot. A 1-ft. length of this wire was satisfactorily welded using 72 volts direct current and a 2-ohm resistor in series. The time of contact was about ½ second.

If there is no source of direct current supply adequate for welding, the same setup and method may be used with an alternating-current supply. In the latter case a little splashing of the oil may occur, but not enough to cause any danger.

To duplicate the experiment mentioned above it was necessary to use from 4 to 6 ohms series resistor in the line with 110 volts alternating current.

Waste-Heat Recovery

(Continued from page 79)

from waste heat, but only about 10 per cent of this large group have taken this advantage." The ideal situation is to be able to alternate, partially at least, the winter heating requirement with the summer refrigeration load, utilizing waste heat in both cases.

4(d) Heating Boiler Feed Water

Boiler feed water heating with exhaust steam, above 0 psi., is common practice. Since the use of exhaust-steam turbines for boiler feed-water pumping is a "natural" in the same unit area as the feed-water heating, consideration should be given to the use of the exhaust steam from the low-pressure turbines for this service. This latter procedure could only be used, of course, when the boiler feed-water temperature is below that of the exhaust steam under vacuum.

5 (a) and (b) Rerouting Water Streams

The two main heating requirements in refinery processing are to do work, and to raise the temperature of the materials being processed. Most of the first requirement is accomplished through the medium of steam, and the second by direct heat contact. The heat absorbed for raising temperature must be removed again in cooling water. Ideally then, why not transfer the heat in the cooling water directly into the boiler by routing the feed water through plant condensers and coolers?

Thus heat used for temperature raising will be transferred over to heat required for doing work, rather than wasted to the atmosphere.

Obstacles arise, such as contamination but with proper sampling devices at the water effluent of each exchanger and oil-water separators where necessary, this ideology may be realized. Chemical treatment problems must be given full consideration. The prime cost of this type of waste-heat recovery is in piping rather than heat-exchange surface, so that a reasonable payout is easily obtained unless line distances are excessive.

Conclusions

A waste-heat-recovery program can range from a few simple changes in operations to a very extensive and complicated procedure. Fig. 2 illustrates a possible power processing flow wherein the most obvious savings from waste heat recovery can be realized.

If only one of each of the calculated examples were capitalized on, excluding most of the items mentioned such as waste heat boilers and refrigeration, the saving, based on the utility costs used in this study, could amount to the following:

	Per day
One furnace efficiency improved	$9.52
One heat exchanger installed	22.90
One shell-and-tube steam superheater installed	8.58
One exhaust steam turbine installed, 200 hp., 40.0 steam rate	38.40
Saving from proper steam traps	10.00
Total saving	$89.40
Annual saving	$32,631.00

It should be reasonable to expect to obtain at least three times this saving in a given year, which would be approximately 10 per cent of an annual million-dollar fuel bill. Good supervision is an integral necessity in recovering this waste heat, but the saving and the supervision are both well justified.

Increased cooperation between processing industries and equipment designers and manufacturers should, in the future, result in additional developments which will improve the possibility of waste-heat recovery.

References

1. Hicks, T. G., Petroleum Refiner, 29, No. 5, 143 (May 1950).

2. Tuttle, R. B., The Oil and Gas Journal, 45, No. 44, 73 (March 8, 1947).

3. Nelson, W. L., The Oil and Gas Journal (October 21, 1948 through December 22, 1949).

4. Berestneff, A. A., Power Engineering, 54, No. 5, 108 (May 1950).

5. McGinnis, W. R., private communication.

TABLE 4—DOLLARS PER TON OF REFRIGERATION (ERECTED)

Evaporator temp., °F.	Compression tons ref. 400	Compression tons ref. 600	Compression tons ref. 1,000	Absorption tons ref. 400	Absorption tons ref. 600	Absorption tons ref. 1,000
20	232	200	188	306	262	240
10	256	228	216	318	268	248
0	292	266	254	330	278	258
—10	320	316	300	344	288	268
—20	400	372	352	362	302	282
—30	468	432	408	384	320	298

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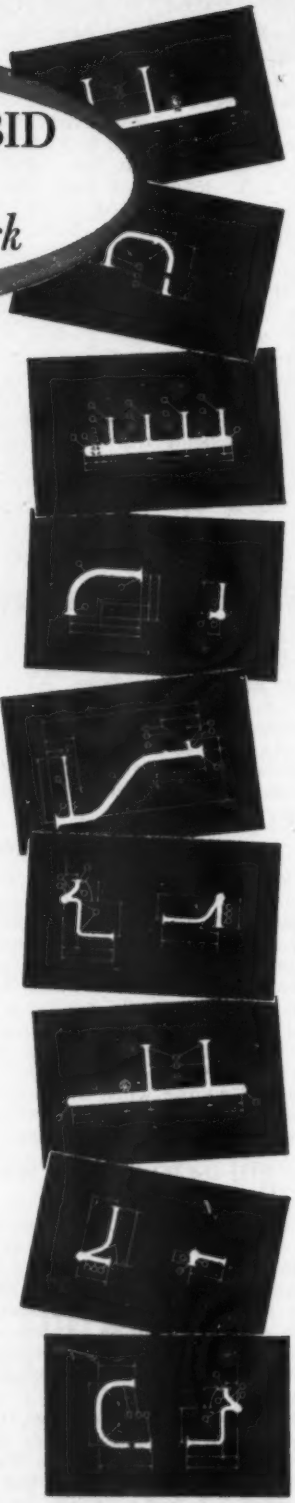
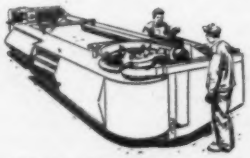
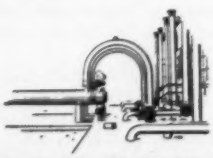


The Manufacturing Division of The Fluor Corporation, Ltd., has expanded its facilities for pipe prefabricating services to the Oil, Gas, Chemical and Power industries. Advantages to the customer are many:



MODERN FACILITIES developed through years of manufacturing fabricated piping and Fluor products such as Mufflers, Gas Cleaners, Pulsation Dampeners, and Fin-Fan Air-Cooled Heat Exchangers.

QUALIFIED PERSONNEL seasoned in the engineering and fabrication of piping to ASME, ASA and API Codes—mostly under customer-inspection conditions.



FIRST-HAND EXPERIENCE gained in the engineering and fabrication of piping for construction contract work in the Oil, Gas, Chemical and Power industries.

STRATEGIC LOCATION of Fluor's prefabrication facilities means a savings in freight rate and handling to the customer—shops in Los Angeles, California, and Paola, Kansas, for the Western and Mid-Continent areas respectively.

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Identifying Interfaces in Product Pipe Lines

(Continued from page 67)

One important point should be emphasized: no appreciable amount of radioactivity remains in the products whose interfaces have been traced with the isotope. This is true for the following reasons:

1. The tracer is immediately diluted when it is injected into the pipe line.
2. The products are stored in tankage and their radioactivity further diluted.
3. An unbelievably small amount of radioactivity is required for detection by the extremely sensitive instruments used. For example, the radiation level at the peak of the interface when the product is on its way through the line is less than that of a common luminous wrist watch dial.
4. As a further safeguard, the isotope by its nature is self-destroying; that is, its radioactivity decreases with age. This was an important point in the selection of this compound.

Along the pipe line, of course, the liquid tracer has been so diluted that no possible hazard exists and no special operating procedures or precautions are needed.

Conclusion

This application of a new scientific development represents a distinct advance in the control of product pipeline movement. It is the subject of patent applications by California Research Corp.

BOOKS

MAPS. A CATALOG OF COPYRIGHT ENTRIES. Vol. 3, Part 6, No. 2. Published by Copyright Office, Library of Congress, Washington, D. C. 84 pp. $50.

This booklet contains a list of 1,000 maps, atlases, and globes published and copyrighted in the United States during the latter half of 1949. Included are maps of oil lands, agricultural products, recreational areas, roads, railroads, parcel-post zones, aerial routes, radio networks, and many others. The information given for each map includes the name of the person or firm under whose authority the map was prepared, title, area, publisher and place of publication, series, size and scale, etc.

A GUIDE TO TECHNICAL WRITING. By W. George Crouch and Robert L. Zetler. Published by Ronald Press Co., 15 East 26th Street, New York 10.

This volume on technical writing is designed as a practical aid for the undergraduate student and for practical technical men. The material is divided into two main sections: (1) the techniques of various kinds of communications; (2) a review of the principles of writing and a grammatical index. The business letter, the technical article, the report, the abstract, and types of oral communication are included in the first section. Throughout, the style has been kept informal, even conversational.

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Rear view of Wilson Torcair — Roadair Rig showing Streamlined Sectional Box Type Compound.

Top view of Sectional Compound with all light lids removed.

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Wilson TORCAIR-ROADAIR GIANT RIGS

The New Wilson Torcair or Roadair Rig — is the First Rig designed specifically to be used either with Torque Converters or Direct Engine Drive! Can be purchased as a Direct Driven Rig (without torque converters) and converters can be added at any time later, with no changes in rig or drive system. Or can be purchased with torque converters, and if desired torque converter can be removed and converted to direct engine drive.

Completely New, from front to rear. Incorporates all the latest and most improved features to be found in any drilling rig, and many new features exclusive to Wilson. *The First All New Post War Rig by any maker that was building power rigs before the War!*

Available with *chain driven rotary table, or universal shaft driven table, or with independent table drive unit.* The latter unit available either *with or without cathead shaft.*

Available with engine radiators conventionally mounted in front of engines, OR with radiators mounted over engines and a bevel gear and V-Belt drive to fans to blow air upwards. This will save about 14" in length of engine unit.

The WILSON GIANT TORCAIR-ROADAIR RIG *can be transported in one unit, or can be broken down into several smaller units where road laws require lesser weights, or lesser widths. The rig that can be moved at minimum cost under any road condition! It is the only rig with four air clutch speeds on the Drum, that can be changed while running, and under load, if desired.*

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1. **Designed to operate either with or without torque converters.**
2. **With Four Friction Clutch Speeds on the Drum.**
3. **Equipped with Air-Tube Disc Clutches, on all Drives. The World's best clutch!**
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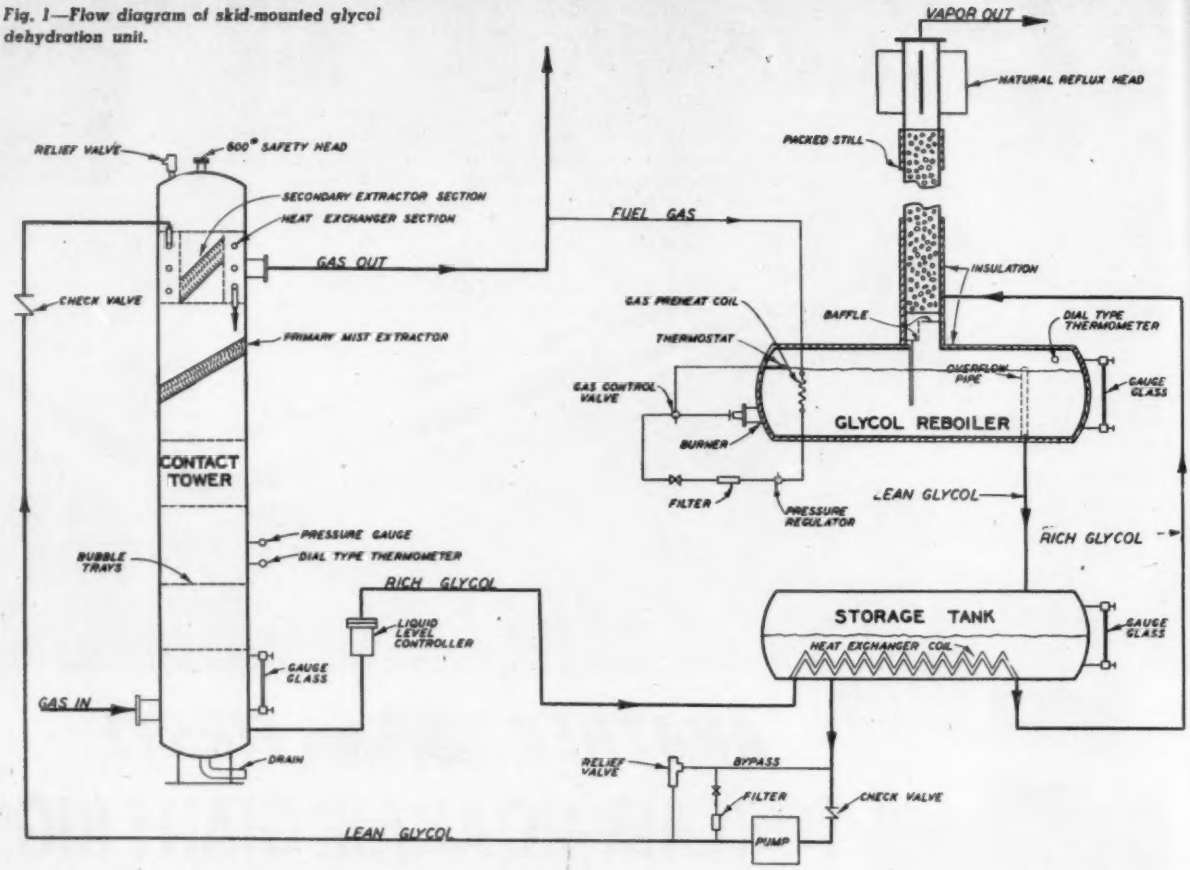

Fig. 1—Flow diagram of skid-mounted glycol dehydration unit.

Installation, Operation, and Performance of a

Skid-Mounted Gas-Dehydration Plant

by L. Harman Peahl*

THIS paper describes the installation, operation, and performance of a skid-mounted gas-dehydration plant, employing triethylene glycol as the liquid absorbent, recently installed by Southern California Gas Co. at its Kettleman Hills station. The subject of gas dehydration together with the various types of plants designed to accomplish this function has been very well covered in previous reports. However, more recent developments in skid-mounted units and the use of triethylene glycol as the dehydrating medium may be of interest to those who have not yet had an opportunity to observe this type of plant in operation. The relatively low cost, simplicity of installation and operation, portability, economy, and satisfactory results obtained are factors that have made this type of plant a very satisfactory solution to certain problems and one that can be recommended for investigation.

*Southern California Gas Co. Presented at transmission conference, Pacific Coast Gas Association, Santa Maria, Calif.

Reason for Installation

The Kettleman Hills dehydration plant was installed for the primary purpose of removing moisture from Kettleman Hills gas that is delivered by Southern Gas Co. to the San Joaquin Valley area for customer distribution. In addition to preventing the formation of gas hydrates, increasing pipe-line efficiencies, and controlling the problems of corrosion due to the accumulation of water in the pipe lines, factors which are usually sufficient to justify the expense of gas dehydration, it was also desired to prevent the entry of water into the distribution lines in the areas served and to reduce the number of service orders attributed to this cause.

Gas received at the Kettleman Hills station is obtained, for the most part, from oil-company absorption plants in the field. Average analysis of the gas is about as follows: Carbon dioxide 0.3 per cent, oxygen 0.1 per cent, methane 87.3 per cent, ethane 11.9 per cent, and nitrogen 0.4 per cent. Heating value averages 1,100 B.t.u. per cubic foot and specific gravity 0.620.

Temperature, when the gas reaches the station, varies from approximately 60° F. in the winter to 90° F. during the summer months. The greater portion of the gas received is used to supply the major transmission lines extending to the north and south. However, quantities as high as 25 M.M.c.f. per day are delivered through approximately 25 miles of 10-in. transmission line to the distribution lines by which it is served to customers in the Hanford and Visalia areas of the San Joaquin Valley.

Ground temperatures below 50° F. and atmospheric temperatures in the

low twenties are not unusual during the winter in this district. Pressure reduction at the point of service is usually accomplished in two stages. A high-pressure regulator is based to reduce the pressure from approximately 300 to 30 psig. The second-stage regulator then reduces pressure from 30 psig. to appliance pressure. Both regulators are generally located aboveground and exposed to the temperature of the atmosphere as well as to the drop in temperature due to pressure reduction.

During past winters a considerable number of "no gas" orders have been received due to freezing in the high-pressure regulators and to swollen regulator seats. These have usually been attributed to moisture in the gas. In a number of instances free water was reported to have been blown from service lines. It was to remedy this situation that dehydration of the gas was considered essential.

Two-stage partial dehydration has been employed at this location. An atmospheric cooling tower, containing gas heat-exchanger sections, is the first stage. However, the amount of cooling obtained in this manner is limited by the temperature at which gas hydrates are formed and restrict the flow of gas through the tubes. This generally occurs at approximately 53° F. at 400-psig. pressure.

In the past, the second stage consisted of a direct-contact plant in which the gas was cooled by direct contact with urea solution that previously had been cooled through atmospheric sections in the cooling tower. With change in operating conditions, greater water removal capacity than that afforded by the existing plant was required.

Selection of the Plant

In searching for an economical solution of this problem, first consideration was given to the use of glycol as the absorbent since the trend in gas dehydration during the past decade has been in this direction. Next, it was necessary to consider the type of load and the fact that the volume was variable and subject to seasonal and daily fluctuations. Since it was possible that the plant might be relocated sometime in the future, the costs of installation and removal were of considerable importance.

Investigation of the dehydration equipment available disclosed that a low-cost unit, mounted on skids, and originally designed for well-head dehydration, could be obtained in standard sizes ranging from a capacity of 1.6 to 12.6 M.c.f. per day at 400 psig. and 80° F. gas inlet temperature.

Since the maximum load was expected to be in the neighborhood of 25 M.M.c.f. per day, it was decided to install two of the 12.6 M.M.c.f. units with the thought in mind that, if the load should increase or decrease materially, one of the units could be shut down or additional units added as required. This provided the flexibility of operation desired. The fact that the units could be purchased for less than $8,000 each, the relatively low cost of installation, and the feature of portability were other items that influenced the selection. These units are designed to operate satisfactorily with either diethylene glycol (DEG) or triethylene glycol (TEG) as the desiccant. Since triethylene glycol is the more efficient of the two, it was selected for our use.

Triethylene glycol is commercially a relatively new compound having a high boiling point, a low corrosion rate, low volatility, and high stability. Its high decomposition temperature of 403.7° F. as compared to 328.1° F. for diethylene glycol permits concentration to more than 98 per cent which is extremely important from the standpoint of dew-point depression obtained, and accounts for its superiority for gas dehydration. The cost, at present, is approximately $2.20 per gallon as compared to $1.83 for diethylene glycol.

Description of Plant

The flow diagram, Fig. 1, illustrates the basic design of these units. Briefly, the wet gas enters at the base of the contact tower in which it is intimately contacted by a counter flow of glycol. Water-rich glycol is drawn off at the bottom of the tower and reconcentrated in a gas-fired reboiler and still. Water-lean glycol from the reboiler flows into the storage tank from where it is pumped back to the contact tower to complete its cycle. Dry gas leaves at the top of the contact tower and water vapor passes off at the top of the still.

The contact towers are 36 in. in diameter and 12 ft. 6 in. high. They are of the wetted wall type and contain four conventional bubble trays with an additional tray in the top to act as a heat exchanger to cool the incoming glycol. Two mist-extractor sections are contained within the upper portions of the towers and glycol cooling coils are built into the top sections where the incoming glycol is cooled by the dehydrated gas.

The regenerating sections consist of (1) a 30-in. by 8-ft. 6-in. gas-fired, fire-tube-type solution reboiler, (2) a 12¾-in. by 6 ft. 6 in. still column packed with Raschig rings and equipped with a natural reflux head, (3) an 18-in. by 8-ft. 6-in., 100-gal.-capacity, glycol-storage tank which contains a heat-exchange coil for the purpose of preheating the water-laden solution en route to the still column by cooling the regenerated glycol, and (4) a ¾ by 2-in. electric motor-driven triplex solution pump.

Regenerating sections are each mounted on three 6-in. I-beam skids and each section occupies a space 12 ft. 3 in. long and 7 ft. 6 in. wide. The contact towers were bolted direct to concrete foundations; however, they may be mounted on skids if desired. Installation consisted of setting the units, connecting inlet and outlet gas piping, installing glycol lines to and from the contact towers and installing gas fuel lines and electrical connections to the pump motors.

Each unit is installed as a completely independent system and may be operated in this manner. The manufacturer's rated capacity per unit is 12.6 M.M.c.f. per day at 400 psig. and 80° gas-inlet temperature. The rated dew-point depression is 50° F. using triethylene glycol. The recommended rate of glycol circulation is 80 gal. per hour.

Reboiler heat capacity is 500,000 B.t.u. per hour and the units are designed for completely automatic operation. The burners are thermostatically controlled by the temperature of the solution in the reboilers and the return flow of solution is controlled by traps mounted on the sides of the towers and located so that they will maintain a predetermined quantity of solution in the bottoms of the towers.

Relief valves are located in the pump bypass connections to protect the pumps and discharge piping against excessive pressures.

General Layout and Gas Flow

The contact towers are located adjacent to the 8-in. transmission line that carries the gas which is to be treated, and the regenerating sections were installed approximately 100 ft. to the east of the towers. Glycol lines, between the towers and the regenerating sections, are placed underground in a common trench. Gas fuel for the reboilers is taken from the dry-gas line after it leaves the contact towers. This connection is located approximately 200 ft. from the reboilers, toward the operator's headquarters, so that in the event of an emergency the fires can be turned off at this point.

All of the gas available at the station from Kettleman Hills field is routed through the atmospheric cooling tower, where it is cooled to approximately 55° F. The cooled gas then passes through liquid separators for removal of condensed water. Gas to be further dehydrated by the glycol plant is taken off in an 8-in. line downstream of the liquid separators, and the remainder of the cooled gas is routed south in the main transmission system. An 8-in. connection was installed between the dehydration gas line downstream of the contact towers and the main transmission line downstream of the 8-in. takeoff to the contact towers so that any dehydrated gas in excess of that required to meet the San Joaquin Valley demand may be returned to the main transmission system. By this arrangement the contact towers may be operated at maximum capacity regardless of load requirements.

Operating Data.

From the standpoint of economy it was decided to operate the towers

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at their combined rated capacity of 25 M.M.c.f. per day. However, this rate is dependent upon operating conditions and gas available. The quantity of gas treated to date has averaged 21.6 M.M.c.f. per day for the two towers. The plant was placed in operation on November 29, 1949, and has now been in service a little over 5 months.

The station is manned on a 24-hour basis so it has been convenient to have an operator inspect the units at regular 2-hour intervals. Operating data have been recorded every 4 hours. This is probably oftener than is necessary and these schedules are subject to change with experience. Following is a representative summary of data recorded during the past few months of operation. Figures shown are the averages of readings taken at regular intervals during this period.

Results Obtained

The accompanying data are an indication of the results being obtained, and on this basis it is possible to make the following observations with respect to performance of the plant during this original period of operation.

1. The average dew-point depression (59° F.) is more than ample to accomplish the required result and is in excess of the manufacturer's rating. This, no doubt, is due to the lower gas-inlet temperature and the higher rate of glycol circulation. It is planned to make further tests at higher gas temperatures and lower glycol rates. The gas temperature may be raised by shutting down the cooling tower and the glycol rate lowered by bypassing a portion of the glycol through the fiber-glass filters in the bypass lines around the glycol pumps.

2. Additional heat transfer between the rich and lean glycol and between the hot glycol and the earth was obtained by burying all of the glycol lines in the same trench. The temperature of the hot glycol, on its way to the contact tower, is being lowered an average of 19°, from 194° to 175° F. The temperature of the cool glycol, returning to the regenerating units, is being increased an average of 9°, from 59° to 67° F. This, of course, was not considered by the manufacturer in rating the units and is, no doubt, partially responsible for the results being obtained.

3. The average glycol circulation rate of 136 gal. per hour is higher than specified. It was necessary to increase the pump speed to obtain better lubrication and there has been no need, so far, to bypass any of the glycol for filtering. The fluid meters furnished with the units were removed due to irregular operation and have not been replaced. Consequently the rates of circulation established are only approximate, having been obtained by observing the rate of fluid level increase in the bottoms of the contact towers with the glycol outlet valves closed.

4. So far as it has been possible to determine, the glycol loss in the plant has been negligible. Laboratory analyses of still condensate indicate a glycol concentration of less than 0.06 per cent which is the lowest measurable percentage. There has been no evidence of any carryover in the dry-gas line and the level of liquid in the storage tanks has remained fairly constant during the past 2½ months of normal operation. Prior to that time a quantity of glycol was lost due to an overflow of the storage tanks on one occasion and a backflow of gas through the contact tower on another. These were unusual circumstances and the plant has not been charged with this amount as a normal operating loss.

5. Total fuel-gas consumption of the reboiler burners has averaged 11 M.c.f. per day for the two units or approximately 500 cu. ft. per M.M.c.f. of gas treated. On an assigned value of $0.25 per M.c.f. for fuel gas this amounts to approximately $2.75 per day or 13 cents per M.M.c.f. of gas treated. It is interesting to note that the average burner input per unit has been 252,000 B.t.u. per hour as compared to the reboiler heat capacity rating of 500,000 B.t.u. per hour.

6. Electricity used to operate the pump motors has averaged 66 kwh. per day or 3 kwh. per M.M.c.f. of gas

SUMMARY OF OPERATING DATA

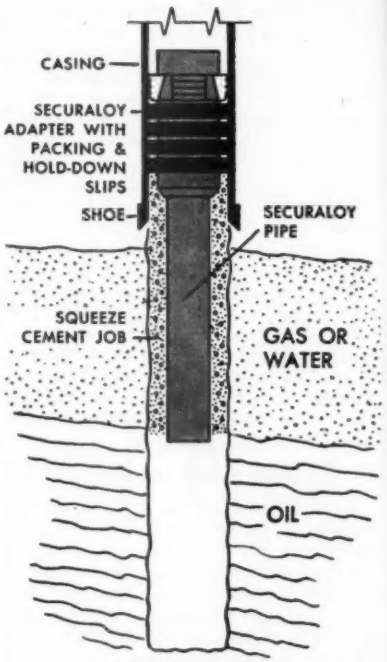
	Unit No. 1	Unit No. 2	Average per unit
Pressure (psig.) Contactor	385	385	385
Temperatures (°F.):			
Gas to contactors	55	55	55
Gas from contactors	66	64	65
Dew point out	—4	—4	—4
Dew-point depression	59	59	59
Atmospheric	....	....	55
Minimum ground	....	....	54
Reboiler	353	351	352
Glycol from storage tank	194	194	194
Glycol to contactors	179	171	175
Glycol from contactors	59	59	59
Glycol to heat exchangers	68	66	67
Quantities:			
Gas treated (M.M.c.f. per day)	11.1	10.5	10.8
Fuel consumed (M.c.f. per day)	....	....	5.5
Electricity used (kwh. per day)	....	....	33
Glycol circulated (gallons per hour)	133	139	136
Storage tank level (gallons)	70	68	69
Laboratory analyses:			
Water in glycol to contactors (per cent)	1.72	1.78	1.75
Water in glycol from contactors (per cent)	3.10	3.00	3.05
Glycol in condensate from stills (per cent)	....	Less than .06	

USE OF SECURALOY SOLVES MANY PRODUCTION PROBLEMS

Securaloy pipe, which may be removed with chemicals or a drilling bit, is being used to solve many "difficult" production problems, such as correcting gas-oil ratios, water shutoffs and plug backs.

CORRECTING GAS-OIL RATIOS

This method is similar to that used in the case history shown on the opposite page except that the Securaloy pipe extends through the gas zone to the top of the oil zone.



Securaloy set on top of producing zone

This method is used where the entire oil zone can be produced from open hole and where it is not necessary to confine the oil production to selective strata. The hole through the oil zone is first filled with gravel. Securaloy pipe is run and squeeze cemented in position. When the cement has set, Securaloy cementing shoe and gravel are cleaned out and well is ready for production, with gas or water successfully under control.

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Main Office and Plant: Whittier, California
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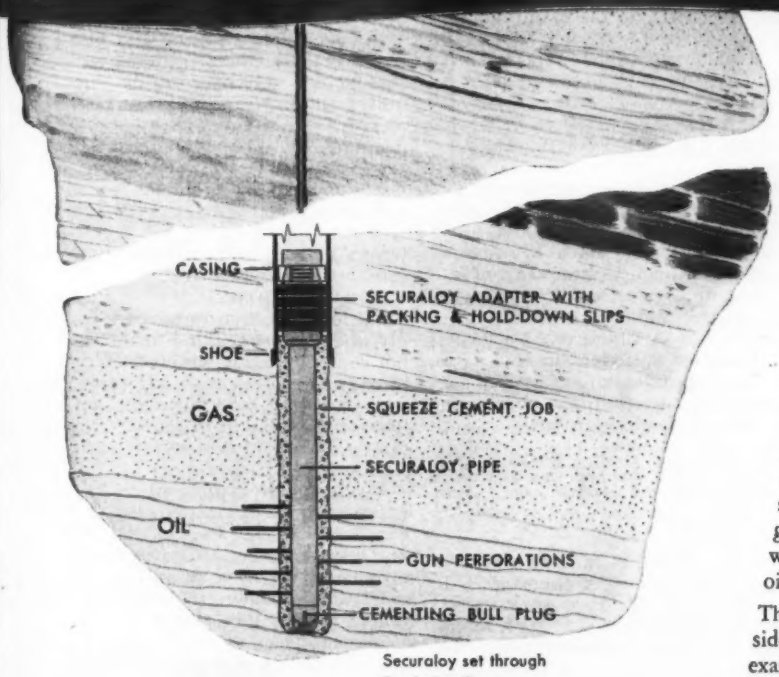
Export Office: Chanin Building, New York City

LOCATION: Texas
GAS-OIL RATIO: 300 to 1
PRODUCTION: 5-6 barrels per day on pump
QUESTION: How to increase production and lower gas-oil ratio by a simple and satisfactory remedial method

Too much gas—Too little oil?



Securaloy set through Producing Zone

When a Texas operator found his gas-oil ratio too high and production way down he determined that the positive way to correct this situation was to use Securaloy. You, too, can profit by using Securaloy to solve your gas-oil ratio problems.

This operator first tried a plastic squeeze job, but the well still made only 6 barrels per day. Then a cement squeeze job was performed, with the entire open hole left full of cement and then drilled out. This proved unsuccessful too!

Finally, the operator cemented Securaloy pipe through the gas-oil sands, as shown. Selective strata were gun perforated and acidized. The well was then completed for 80 barrels of oil per day with a 40 to 1 gas-oil ratio!

This same remedial method is now considered standard practice . . . Another example of the application of Securaloy to solve your production problems.

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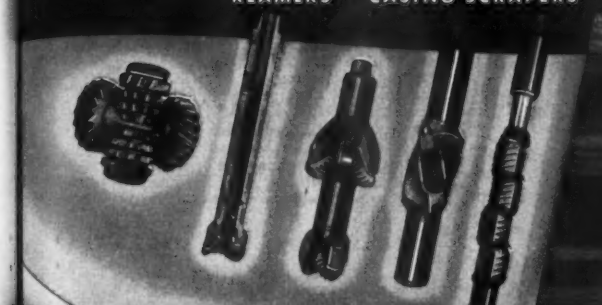

Securaloy

PRODUCTION EQUIPMENT

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Branches in all of the major producing areas
Export Office: Chanin Building, New York City

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treated. The cost of this item has been $1.10 per day or 5 cents per M.M.c.f. of gas treated.

7. Laboratory distillation of the rich and lean glycol samples, taken periodically, indicates an average water content of 1.75 per cent in the glycol entering the towers and 3.05 per cent in the glycol leaving the towers. These figures indicate that the water being removed from the gas has averaged 1.30 per cent by volume of the glycol being circulated or 3.54 gal. per hour. This is equal to 3.90 gal. or 32.5 lb. per M.M.c.f. of gas treated.

Using the average dew-point depression obtained and the water-vapor-content chart* prepared by the University of Oklahoma engineering department, the water removed may also be calculated by the following method. The water-vapor content of the saturated gas, entering the contactors at 55° F. and 400 psia., is 32 lb. per M.M.c.f. The water-vapor content of gas with a dew point of minus 4° F. at 400 psia., the condition under which it leaves the contactors, is 3.2 lb. per M.M.c.f. The water being removed from the gas, on this basis, would be 28.8 lb. per M.M.c.f., 3.45 gal. per M.M.c.f., or 3.11 gal. per hour. These figures are in fair agreement with those given herewith since, due to the relatively large volume of gas treated, any slight error in the determination of flow rates, dew points, or glycol concentrations would be magnified in the final results.

According to results of the laboratory tests, average glycol concentration of the glycol stream discharged from the contactors is 96.95 per cent and glycol concentration of the glycol stream entering the contactors is 98.25 per cent. This indicates very good glycol regeneration. In this respect it should be noted that, while the average reboiler temperature has been 353° F., temperatures of 375° or higher are permissible if necessary to gain the required efficiency.

Plant Maintenance

No serious maintenance problems have been encountered in plant operations thus far. Numerous small glycol leaks have developed in the plant piping, especially in the hot lines and in threaded joints, but these are being gradually controlled. Some difficulty has been experienced in establishing circulation with the glycol pumps after a shutdown. However, this has been practically eliminated by priming with water from an outside source. A hose connection and a check valve were installed in the suction lines to the pumps to facilitate this operation. It has been necessary to grind the pump valves once since installation. However, this is considered normal maintenance.

The liquid level control on the No. 2 tower has failed to operate on several occasions. This control is an inverted bucket-type trap and in each case it was found that a small particle of foreign material, possibly present in the tower at the time of installation, had plugged the vent hole in the top of the bucket. The installation of strainers in the glycol lines ahead of the traps is expected to eliminate this trouble.

The reboiler pilot lights were extinguished once in a severe windstorm. This was discovered by the operator on his regular tour of inspection and plant operations were not affected. It is proposed to install safety shutoff controls in the burner fuel lines so that the gas supply will be discontinued automatically in the event a pilot light goes out or the electric power fails.

*See The Oil and Gas Journal, January 5, 1950, page 59.

Operating Costs

The plant has not been in service a sufficient length of time to arrive at an accurate estimate of operating costs. According to the manufacturer, a glycol loss of 0.1 gal. per M.M.c.f. of gas treated should be expected. At rated capacity this would amount to 2.5 gal. per day or $5.23 per day, at the current price of triethylene glycol, and would be a major item of expense.

Our experience, as previously explained, has not disclosed any substantial loss at present operating pressures and gas flow rates. We should probably assume, for the sake of estimation, that over a period of time some glycol makeup will, however, be necessary. A figure of 0.5 gal. per day. should be sufficient to cover this loss. An approximate estimate of operating costs, excluding labor, etc., may then be made as follows:

Fuel gas consumed, 11 M.c.f. per day	$2.75
Electricity used, 66 kwh. per day	$1.10
Glycol loss (est.), 0.5 gal. per day	$1.10
Total (per day)	$4.95

At rated capacity, 25 M.M.c.f. per day, the approximate cost of operation will be 20 cents per M.c.f. of gas treated. This corresponds to 6 cents per actual gallon of water removed from the gas.

Summary of Plant Performance

The following table of comparative figures is of further interest in rating the performance of the plant.

	Manuf. estimate	Actual operation
Gas treated, M.M.c.f. per day	25.2	21.6
Dew-point depression, °F.	50	59
Gas fuel consumed:		
M.c.f. per day	.....	11
M.c.f. per M.M.c.f.	.....	0.5
Glycol circulated, gal. per hour	160	272
Water removed, gal. per M.M.c.f.	.....	3.68
Glycol loss, gal. per M.M.c.f.	0.1	Small
Operating cost:		
Per day	$10.00	$4.95
Per M.M.c.f.	$ .40	$ .20

Final proof of satisfactory performance should probably be gaged by the results obtained in correcting the moisture problems that existed in the transmission line and subsequent distribution facilities prior to the installation of the plant. Drips along the transmission line, from which an average of 71 gal. of liquid per month was previously removed, have been dry for the past 3 months.

Reports from the distribution areas indicate a substantial reduction in "no gas" orders due to frozen regulators, swollen regulator seats, and other causes attributed to moisture in the gas. These orders have been reduced from an average of 19 per month, during the winter of 1947-48, to an average of five per month since the plant has been in service. Also, the free water that was previously blown from the lines has been practically eliminated. Further improvement is expected as the distribution lines are dried up.

Conclusion

In conclusion it can be said that apparently this plant is doing a very satisfactory job of meeting the requirements for which it was installed and the skid-mounted glycol dehydration unit is worthy of consideration as a possible solution where similar dehydration problems exist. A dew-point depression in excess of the manufacturer's rating has been obtained at approximately one-half the estimated operating cost.

The original investment is substantially less than that required for other glycol-type systems and installation is not complicated. A minimum of maintenance and operation attention has been required, and the fact that the units are available in various capacities is an added advantage from the standpoint of flexibility.

In closing it is desired to express appreciation to Black, Sivalls & Bryson, Inc., and Joe Conrin, its California representative, for permission to reproduce the flow diagram and to use certain other information contained within this report.

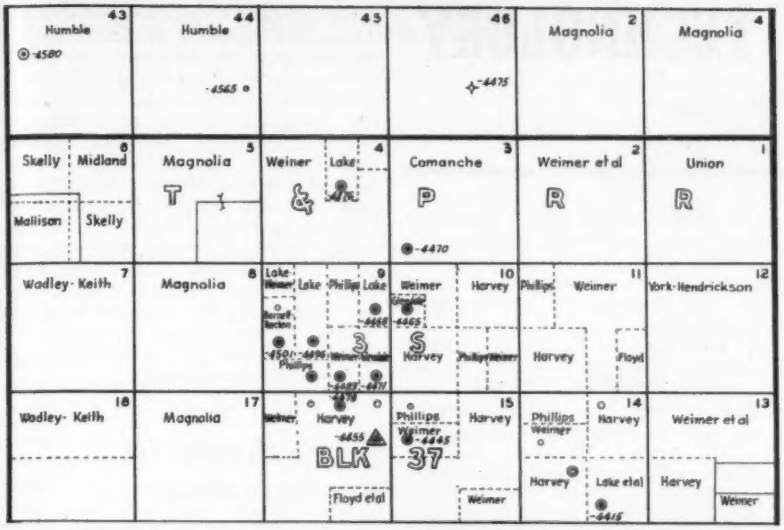
BOOKS

APPLIED GEOLOGY. Published as Vol. 45, No. 1B, of the Quarterly of Colorado School of Mines, Golden, Colo. 343 pp. $3.

This is a number of the seventy-fifth Anniversary volume entitled "Mineral Resources in World Affairs," which will make available all of the papers delivered at the conferences on the occasion of the seventy-fifth anniversary of the school. The current issue contains the papers delivered at the conferences on petroleum geology and hydrology, engineering geology, and mining geology September 30 and October 1, 1949. The volume contains 81 illustrations, tables, and maps.

SUBJECT INDEX TO BIBLIOGRAPHY OF SCIENTIFIC REPORTS. Published by Office of Technical Services, U. S. Department of Commerce, Washington, D. C. $1.

This new index enables researchers to locate reports on any subject carried by the Bibliography in the period January-June 1949. Subject headings are comprehensive and include trade names.



This drilling concentration is 15 miles southeast of Midland, Tex. Midland County currently has a lot of field activity—Pegasus, Magnolia's Roy Parks area, and Tex Harvey field discussed in the accompanying article. (Base map courtesy Southwest Mapping Co., Fort Worth).

Dozen Rigs Now Running In Tex Harvey Field

by Roy F. Carlson
Dallas District Editor

ONE of West Texas' most promising fields — Tex Harvey — is rapidly being developed in the east-central part of Midland County. Fourteen wells have been drilled, and the field is eventually expected to have nearly 500—on an acreage equivalent to about 30 sections.

The discovery well is only about a year and a half old, and most of the development wells have been drilled in the last 12 months. There are 12 rigs running in the field, one of the largest concentrations of heavy drilling equipment in West Texas outside of the Scurry County fields.

The pay in Tex Harvey field is one or both of two zones of porosity in the Spraberry sand. The Spraberry is about 1,000 ft. thick in the field and near its center has a section of tight shale that, although showing oil, is too tight to pay. The upper porous section is a zone about 300 ft. thick that is composed of alternate layers of shaly sand and tight shale.

The bottom section of porosity is very similar. In all of the 1,000 ft. of Spraberry there is probably about 250 ft. of productive sand and that is hard and tight—so hard and tight, in fact, that shooting of every well is a necessity. Shots of 700 and 800 qt. of a new solidified oil-well explosive are common.

The principal drainage from the Spraberry seems to be through fractures rather than intergranular permeability, and these fractures are enlarged or others produced by shooting. Cores from the upper zone of porosity have an average permeability of .2 md. and a porosity of about 15 per cent as obtained with conventional analysis. However, this analysis probably does not properly evaluate the part that the fractures play in draining the reservoir.

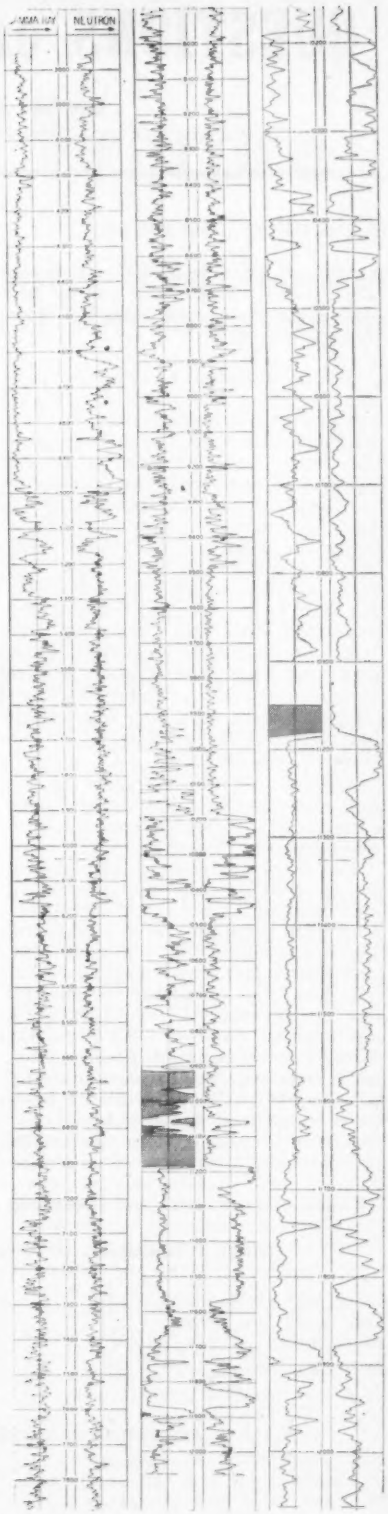
Two Estimates Available

Two estimates of recoverable oil are available from the core data. If only gas expansion proves effective, recoverable oil will be on the order of 97 bbl. per acre-foot. If natural water encroachment proves effective, recovery is estimated at 279 bbl. per acre-foot.

Bottom-hole pressures in Tex Harvey field as determined on drill-stem tests are on the order of 2,700 psi. Reservoir temperatures are 150° to 165° F. Initial potentials after shooting vary from 136 to 456 bbl. per day. The oil is sweet and has a gravity of 37° A.P.I.

The pay acts very similarly to the Weber sand in Rangely (Colorado) field. It is difficult to drill and difficult to produce. Only 25 to 30 ft. of

(Continued on page 101)



***FORMATIONS.**—This radioactivity log shows the formational conditions to 12,064 ft. total depth. Log is for Tex Harvey Oil Co. 1 Floyd Estate, Midland County, located 660 ft. from southeast corner, northeast quarter, Section 16, Block 37, T-3-S, T&P Survey.*

XUM

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Operating Cost Index

We note your Refinery Construction Cost Index. What have you to suggest about the cost of operation of refineries?—F. C. P.

The development of accurate refinery operating cost index is difficult because of the wide variety of processing schemes that are employed. Not only are different processing operations employed but the degree to which they are applied is a variable. An important item in refinery operation is the cost of fuel for heating and for power generation. The fuel cost can easily be introduced but the per barrel cost of fuel varies so widely that the Operating Cost Index jumps around erratically. Thus, operating costs were higher in 1948 than in any other year because fuel-oil prices were high, and the operating costs in 1949 were very low because of low fuel costs.

A study of over 168 plant operations indicates the following operating costs stated as percentages of the total operating cost (Table 1).

The great variation arises because three widely differing processing arrangements were considered—(1) Maximum gasoline by topping and thermal cracking, (2) maximum distillate by topping and thermal cracking, and (3) maximum octane by topping and catalytic cracking. Crude oils ranging from 13° A.P.I. to 41° A.P.I. were considered. Finally costs were obtained for 8 years ranging back to 1931. All of the plants were for a capacity of 30,000 bbl. per day, and thus a further variable would be introduced if plant sizes were also varied.

Labor, supervision, and **overhead** costs can be judged by the Operating Labor Index published at quarterly intervals (January, April, July, and October) in The Oil and Gas Journal under the heading of Cost-imating. An even more direct source for current wage rates is Survey of Current Business, published by the U. S. Department of Labor.

Fuel, power, and **water** pumping costs can be judged by the posted prices of Bunker C fuel oil.

Depreciation and **maintenance** costs are a function of the cost of plant construction. The Nelson Refinery Construction Cost Index which appears in the first issue of each month in The Oil and Gas Journal may be used. Question arises as to the date at which the construction cost should be taken. For simplicity the construction cost index may be taken for the year under consideration, even if the plant has been built for many years. One justification for such a selection is the fact that all plants must compete with the most recently constructed plants.

Leading and **chemical** costs are troublesome. About the only basis that presents itself is the amount of tetratehyl lead required to bring the entire plant gasoline to the current regular octane number requirement. The approximate cc. of TEL required during the years 1931-1950 were:

	cc-TEL	Index
1931	0	0
1934	0.2	18
1937	0.25	23
1940	0.4	36
1946	1.1	100
1948	2.1	191
1949	2.4	218
Now	2.7	246

If the several operating groups are weighted according to the two average operations shown in Table 1, the Operating Cost Indexes for the 8 years behave as indicated in Table 2. Note that values cannot be estimated by interpolation for the years not shown, because at least the fuel-oil cost does not vary uniformly. It will be noted that the indexes for 1948 and 1949 are greatly influenced by the cost of fuel, and that the cost of tetraethyl lead greatly increases the costs of operation after about 1946. Particularly, it should be noted that the index does not vary in the same manner as the common indexes of the costs of materials or construction, nor as the cost of labor.

TABLE 1—GROUPING OF OPERATING COSTS, PERCENTAGE

Cost item	Range	Average operations	
Labor, supervision, and overhead	9.5-19.8	15	15
Fuel, water, and power	21.6-57.5	35	45
Depreciation and maintenance	19.5-48.8	30	40
Tetraethyl lead and chamicals	0.5-30.0	20	0
		100	100

TABLE 2—APPROXIMATE OPERATING COST INDEXES, 1946 = 100

Year, July 1	Range	Average conditions
1931	44- 55	52 Normal—but low crude price
1934	58- 69	67 High fuel price
1937	64- 75	71 Normal
1940	65- 71	70 Catalytic cracking introduced
1946	100	100 Octane race is on
1948	165-171	170 High fuel price
1949*	124-144	135 Low fuel price
Now	133-157	150 Normal—but crude price high

*April 1949.

Octane Numbers by Aviation Methods

In your question of May 26, 1949, you show the relationship between octane numbers by the research and the motor methods. What is the relation of these to the aviation-gasoline testing methods?—F. R. P.

This was discussed in our answer of January 27, 1944, but since that time the methods have been altered some and the names or designations have been changed. The lean-mixture aviation method originally known as the 1-C method, now better known as A.S.T.M. D-614 (or AN-F-19) usually rates fuels at about 1-octane number higher than the motor method (A.S.T.M. D-357). However, the exact relationship depends somewhat on the level of octane number encountered. The corrections shown in Table 1 are indicated by the report of February 8, 1946, of the Coordinating Research Council "Report of Exchange Groups, Aviation Fuels Division."

TABLE 1—APPROXIMATE CORRECTIONS OF LEAN MIXTURE OCTANE NUMBERS TO OBTAIN MOTOR METHOD OCTANE NUMBERS

Lean mixture (aviation method) rating	Approximate correction to obtain motor method rating
81.1 O.N.	—0.5 units O.N.
92.8 O.N.	—1.6 units O.N.
105.0 P.N.*	—1.1 units P.N.*
117.0 P.N.*	1.7 units P.N.*

*Performance number—grossly, somewhat the equivalent of octane number.

Although the rich mixture rating method that employs supercharging (A.S.T.M. D-909 or AN-F-18) gives results that have no direct relation with either the motor or the aviation method, it is somewhat related to the ratings by the research method, in that it gives higher values than the motor method for aviation fuels. Particularly, the aviation supercharge method gives ratings that are high for aromatic-rich fuels.

Lowering-in Procedure Incorporating the

SLACK LOOP Practice

as used by El Paso Natural on construction of 30-in. transmission line

by T. B. LaRock*

THE 30-in. transmission line of El Paso Natural Gas Co. now under construction is essentially a loop of the 26-in. line built in 1947 from the Jal-Eunice area of New Mexico, connecting the oil and gas fields of the Permian basin with the distribution systems serving Southern California at Blythe, Calif., plus a crossover line that connects this 26-30-in. system to the line that will serve the San Francisco area at Topock, Ariz.

Pressure and Temperature Conditions

There are seven booster stations on the 26-30-in. system located at approximately 100-mile intervals. These stations operate at a maximum design discharge pressure of 840 psi. and suction pressures to about 620 psi. at some stations, depending upon load requirements.

Discharge temperature at all booster stations is maintained below 90°F. Suction temperatures have been recorded as low as 40° F. during the winter in the predominantly colder eastern region of the line, while 45° F. is the minimum suction temperature at the more westerly stations. The minimum recorded at the Blythe metering station has been 54° F. Maximum suction temperatures recorded are: 77° F. at the eastern stations, 87° at the booster stations on the western end of the line, and 93° F. at the Blythe metering station.

Pipe used on the discharge side of all booster stations is 0.335-in. wall thickness for approximately 50 miles. The remaining 50 miles of pipe is 0.324-in. wall thickness to the suction of the next station. Main-line block valves are located at approximately 8-mile intervals.

*Engineering department, El Paso Natural Gas Co. Presented at transmission conference, Pacific Coast Gas Association, Santa Maria, Calif.

Considerations as to Line Slack

El Paso Natural Gas has been accused of being "slack happy." This we do not deny and feel that we have very good reasons for trying to put all the slack necessary in a pipe line. We operate in a section of the country in which seasonal atmospheric temperatures range 100° F. and the ground temperature at pipe level range 40° F., as noted by the suction temperatures at the stations listed above.

Our original 16-in. line from Jal to El Paso was one of the first all-welded large-diameter pipe lines built. This type of construction being new, the engineers recognized the need for some provision that would allow for contraction and expansion in the line due to temperature changes. Expansion joints of the "wrinkle belly" type were used. These proved ineffective as during the first winter of operation about 150 girth welds failed and during the second winter about 100 breaks occurred. Tests that were made on the expansion joints showed the tensile loading did not cause movement of the expansion joints but was concentrated between the joints.

Granted that pipe line welding in 1928 and 1929 did not approach present-day standards, partially offsetting this is the fact that pipe during that period was not stressed as is the pipe in today's transmission lines.

El Paso has had two other experiences where breaks in the girth welds have caused trouble. One was a section of 16-in. line that was reconditioned during the summer of 1948 and the crew failed to provide adequate slack with resulting girth weld failures the following winter. In order to correct this, the line was cut every 1,000 ft. and allowed to contract after which "pup joints" were welded into the line. No further trouble was experienced with this line.

The other experience that we had with repeated failures of girth welds was in a section of 12-in. line that was welded with a new technique and probably all the slack in the world would not have helped the girth welds.

El Paso does its own construction and since 1935 has built over 3,000 miles of transmission lines. Since the beginning of the California project in 1947 we have built some 1,600 miles of 20, 24, 26, and 30-in. line, and have not had a single girth-weld failure. We have had about 30 to 40 leaks due to pinholes or cracked welds. The cracked welds occurred in pipe whose carbon content was from 33 to 38

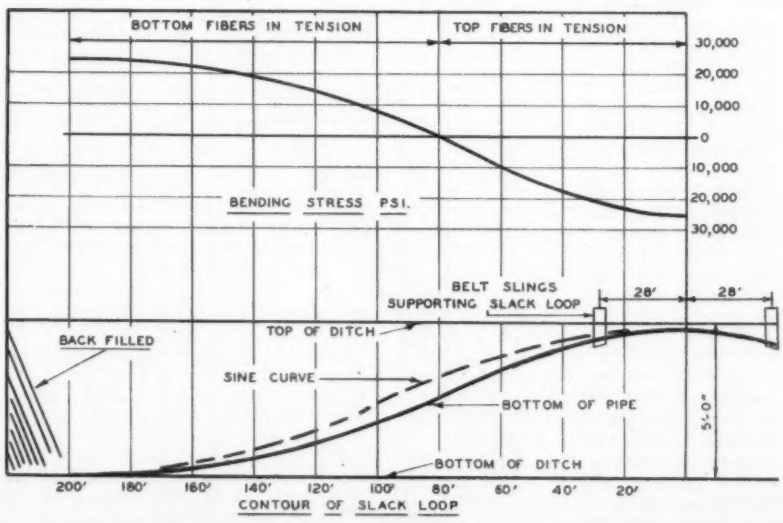


Fig. 1—Contour of slack loop, El Paso 30-in. line. At top are approximate values of the bending stresses in slack loop, suspended at the two points shown.

points and the manganese was from 140 to 165 points. These cracked welds were located during the testing of the line prior to putting it into operation.

We believe we have top pipe-line welders and that our welds are as good as those in any pipe line. The welds are checked periodically by both gamma ray and destructive tests. We also believe that due to conditions beyond our control and at times beyond the control of the welders, every weld in our line is not 100 per cent.

These thoughts have been advanced to show reasons why we are slack happy.

Construction Procedure

Ditching for the pipe is 44 in. wide and to a depth of 60 in. to insure a minimum of 30 in. of cover over the line. This cover is increased to 60 in. where the line passes through cultivated areas.

The majority of the 30-in. o.d. pipe is strung on the line in 60-ft. lengths after having been joined by automatic welding from two 30-ft. units. The pipe is then bent to conform to the contour of the ditch. Wrinkle bends are predominant with some portions of the line having been bent with the smooth type bending machine.

The pipe sections are then welded and coated with a coal-tar enamel covered with either asbestos felt or a glass-fiber wrapping. Lowering in of pipe is delayed until the morning after the pipe has been coated to allow the coating to set and the pipe to cool. During the hot spring and summer months the lowering-in procedure is begun as early as 3 a.m. so that the pipe will be in the ditch and covered before the sun can raise the pipe temperature.

A break is left in the welded line every 3,000 to 4,000 ft. to facilitate handling and to establish a new origin for measurement of the bends so that accumulative errors will be minimized.

As the pipe-line sections are lowered into the ditch a dozer follows up, covering the pipe with the exception of the breaks and the slack loops. The breaks are left uncovered for a distance of 200 ft. on each side of the loose ends.

The slack loops that are placed every 1,000 ft. between breaks are 400 ft. of uncovered line that is suspended above the ditch. This is done by the use of two steel box beams with belt slings that carry the pipe. The beams are placed about 60 ft. apart at the center of the slack loop. The beams are cribbed high enough so that the bottom of the pipe is about 5 ft. off the ditch bottom at the center of the loop. This gradually decreases to where the pipe rests on the bottom of the ditch where the fill has stopped at each end of the loop.

After all the line has been lowered in with the slack loops suspended, the breaks in the section are then welded together. This is done by lifting the loose ends clear of the ditch and cutting the pipe to fit in this suspended position. The break is then welded and lowered back into the ditch and covered. The slack loops are lowered in as the initial operation of lowering in the following morning and the procedure is then repeated.

In addition to limiting the lowering in of pipe to temperatures of 70° F. or below, these slack loops induce slack into the line that will compensate for pipe temperatures that will be lower than the pipe when it was buried. During the cold winter months it is not difficult to complete the lowering in of the pipe at temperatures of 50° F. or less, but during hot months the pipe may be 70° F. when it is buried.

Should a pipe line be buried at 70°F. without any slack and the pipe temperature should be lowered to 40° F., this difference would induce a longitudinal tensile stress of 6,000 psi. This stress would increase by 30 per cent the stress of 18,000 psi. due to an internal pressure of 800 psi. on a 30-in. o.d. pipe line of 0.335-in. wall thickness. Elimination of this additional stress is the primary purpose of slack loops.

In rolling or rough country the frequency of slack loops is greatly reduced as all bends act as expansion joints, relieving stresses that will be induced by temperature changes. All bends are fitted so that the sags fit snug against the ditch bottom, while the overbends stand above the ditch bottom and the side bends fit against the outside curve of the ditch. The survey party that stakes the bends adds a small deflection to the overbends, thereby insuring that they will not touch the bottom of the ditch at the apex of the overbend.

Measurements and observations were made on two sections of pipe line during lowering-in operations. The pipe temperature was recorded by recording thermometers having bulbs inserted into thermowells in the pipe.

Each section of pipe line was measured in lengths while resting on the skids prior to lowering in. Reference points were established at each end of the section and in between the location of each slack loop.

On the first section the reference points were established at a pipe temperature of 85° F. and the temperature of the pipe at the beginning of lowering in was 50° F. while it was 55° F. at the end of the operation.

Within 30 minutes after the pipe had been covered the pipe temperature rose to 70° F. and remained at this temperature during a 24-hour check. This corresponds with the 70° F. ground temperature which was measured for a 24-hour period. This section was originally 3,000 ft. long with three slack loops placed between the breaks in the end of the section.

The slack loops were placed 750 ft. apart with 350 ft. of fill anchoring the pipe between slack loops. The reference points were checked after the pipe was lowered in with the slack loops suspended and the length of the section between the ends points had contracted 14 in.

Contours of the loops were made to determine the amount of slack per loop. On an average the loops approximated sine curves having an amplitude of 2.5 ft. and a wave length of 400 ft. This yields a curve that is

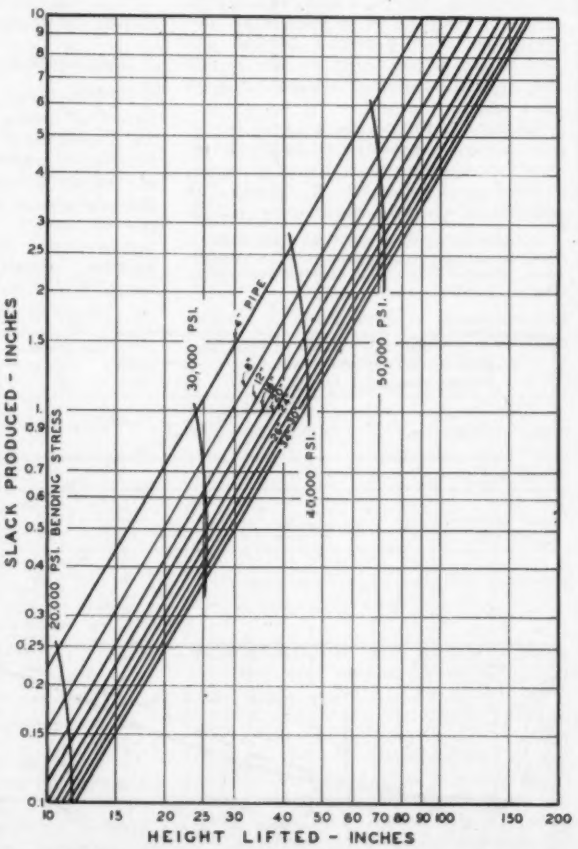


Fig. 2—Graph showing slack length and maximum bending stress produced by lifting pipe at one point. For pipe sizes 4 to 34-in.

2 in. longer than the 400-ft. base. In other words each loop would produce 2 in. of slack. The remaining 8-in. contraction was caused by the cooling of the section from the temperature at which the pipe was measured.

The reference points were again checked after the breaks had been welded and buried. There was no measurable movement of the line. The next morning the slack loops were lowered in at a pipe temperature of 55° F. The reference points were again checked and no movement could be noticed. It would, therefore, seem that the original 350 ft. of fill between loops is adequate for anchoring the line to retain the compression set up by the slack loops.

Observations of the reference points, after lowering in had been completed, indicated that the pipe lay in the ditch in a "snaky" fashion. The pipe that was anchored between slack loops tended to crowd the side of the ditch where the back-fill was located while the slack loops after lowering in rested hard against the opposite wall of the ditch. The portion of the pipe at the midpoint of the loop was observed to stand slightly off the ditch bottom before the pipe was covered, but after covering, the pipe rested on the ditch bottom. It is believed that the soil friction retains the compressive stress within the original length of the slack loop until the line is put into operation and the internal operating pressure causes the line to "work," thereby distributing this compression stress along the line.

On the second section, which was 3,600 ft. in length, the original measurements were made at 120° F. Again the temperature during lowering in and placing of the slack looks was 55° F. The check of the end points indicated that the line had contracted 24 in. The three slack loops accounted for 6 in. while the remaining 18 in. of contraction was caused by the 65° drop in the pipe temperature.

The slack loops in this section were placed about 1,000 ft. apart. The anchored portions were covered with about 500 ft. of backfill. Again the average slack loop contour was that of the sine wave as previously described providing approximately 2 in. of slack per loop.

The pipe in the second section displayed the same general pattern as that in the previous section. Again the portions of the line that had been the suspended slack loops did not rest on the bottom of the ditch. The pipe was also observed to lay in the ditch in the same general snaky arrangement.

The welds that are made connecting each break in a section essentially become slack loops as these welds are cut and made while the pipe is suspended out of the ditch. After the weld has been made and lowered into the ditch, the pipe snakes in the same general fashion of the slack loops.

Now with slack loops being placed every 1,000 ft., with tie-in welds being made every 3,000 to 4,000 ft., there is approximately 12 in. of slack induced into the line every mile of pipe line.

This 12 in. of slack will tend to relieve the longitudinal tensile stress set up in the line by a 30° F. drop in temperature below 70° F., which is the maximum temperature during lowering in of the pipe line. This may be illustrated by the fact that 1 mile of pipe line that experiences a drop of 30° F. in pipe temperature, if allowed to contract unrestrained, will shorten by 12 in.

There is a general belief that, once a line has been under operation for 2 years, the longitudinal tensile stresses which result from lowering of the pipe temperature below that when it was installed will be minimized by the increase of soil friction as the fill packs more solidly around the pipe. This argument is backed up by most pipe lines in that the majority of the line failures occur during the first 2 years of line operation.

The contour of the average slack loop as used in the 30-in. line is shown in Fig. 1. Above the contour is an approximate value of the bending stresses produced in the slack loop caused by suspending the loop at two points as shown.

The graph, Fig. 2, borrowed from the analytical reductions made by Southern Counties Gas Co. as an aid in the preparation of this paper, covers pipe sizes from 4 to 34-in. It will be noted in Fig. 2 that the maximum bending stress produced by lifting 30-in. pipe 60 in. high at one suspension point for a slack loop is approximately 45,000 psi., while by Fig. 1, with the same condition except lifted at the two points as shown, there is only 25,000-psi. bending stress.

Dozen Rigs Running In Tex Harvey Field

(Continued from page 97)

the pay section can be drilled with a hard-rock bit.

There are other problems in drilling, too, and one of these is a scarcity of water. Drilling water is obtained from ranchers' wells or from wells drilled by contractors. Added to this water trouble is the presence of lost-circulation zones, found in the fractured pay and in the upper San Andres or Grayburg formation. The higher of these two zones (San Andres) is drilled using a mud with a high water loss, the idea being to build up a very thick filter cake on the bore-hole walls.

Lost circulation in the pay is countered by drilling in with oil and with reverse circulation. This practice keeps excessive pressures off the formation and prevents contamination of the tight pay with drilling water. During the process, however, the pay takes quite a bit of oil. Other than in these two troublesome spots, drilling can be conducted with clear water.

The casing program in the field varies widely. Some operators use three full strings, others set two strings and liner. Besides the surface string, the intermediate string is set at about 4,500 ft., and the production string or liner is set at 7,000 ft. on top of the pay. Some operators use intermediate and production strings of 8⅝ and 5½-in. pipe; others use 9⅝ and 7-in. pipe.

Use of the liner rather than a full string of pipe saves about $5,000 per well. Each well costs, fully equipped, about $95,000. Drilling time is about 65 days at present. Drilling in with reverse circulation calls for day work at $500 per day plus drill pipe at 1 cent per foot per day.

Tex Harvey field lies in the same position relative to the edge of the Midland basin as does Benedum field, some 40 miles to the south in Upton and Reagan counties. The pay section is thought to represent an old shore line, and if this is true a series of similar pools may lie on a trend from Benedum to as far north as Spraberry field in Dawson County. A well has recently been completed about 10 miles north of Tex Harvey field, in which the Spraberry top checked in just 22 ft. low to the Tex Harvey discovery well. This well apparently is on the same trend.

Shot pictures of the area show some closure in the Spraberry, but the limits of the field have not yet been determined by drilling. In fact, in the drilling to date, no reversal of dip has shown as development has progressed up dip and eastward. The pay zone is a hard shaly sand, and is thoroughly fractured in several directions. Vertical fractures of 10 ft. or more have been noted in cores of the Spraberry.

Several wells had been drilled in the area before Tex Harvey 1 B. W. Floyd, the field discovery well. Oddly enough, some of these penetrated the Spraberry section, and on tests of that or lower section, wells often flowed mud out of the hole, but it was not until early in 1949 that the Tex Harvey well was completed as a Spraberry producer. Tex Harvey field, along with shows from Spraberry in Pegasus and Peck fields and in the 2 Roy Parks, Ellenburger discovery of Magnolia, and the production in Spraberry field have combined to make the Spraberry sand a prolific oil horizon.

FORMATION TOPS

	Ft.
Anhydrite	1,520
Grayburg	3,820
Strawn	10,180
Devonian	11,174
Silurian	11,565
Fusselman	11,705
Ellenburger	11,940

Productive horizons found from 7,865-75 and 8,045-55 ft. through perforations into the Spraberry sand.

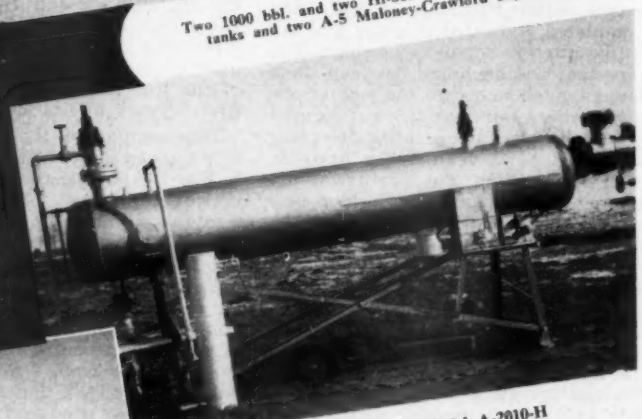
XUM

MALONEY-CRAWFORD

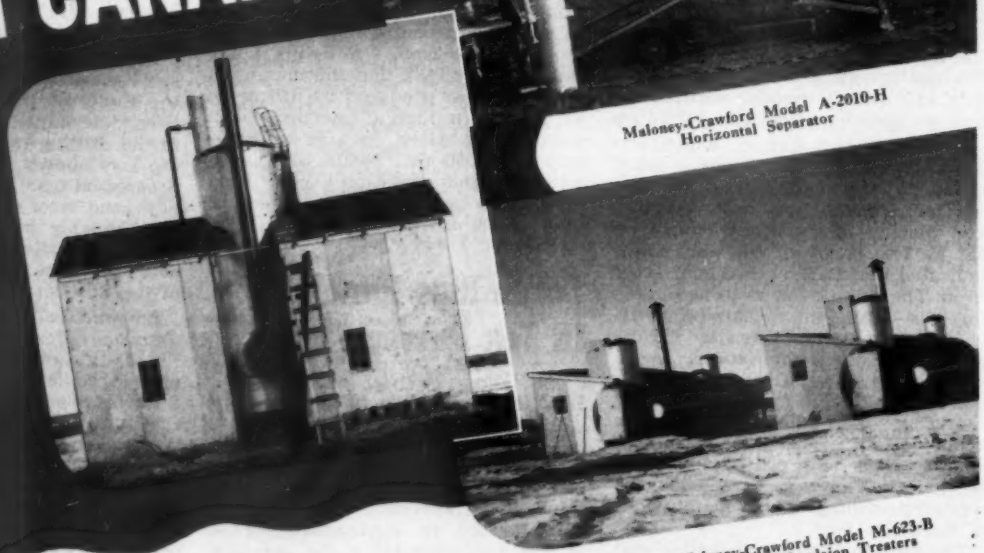
TANKS
SEPARATORS
TREATERS

in CANADA

Two 1000 bbl. and two Hi-500 bbl. Maloney-Crawford tanks and two A-5 Maloney-Crawford Separators



Maloney-Crawford Model A-2010-H Horizontal Separator



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XUM

Heterogeneous Solution-Gas-Drive Reservoir

THEORETICAL work on solution-gas-drive reservoirs is based upon the assumption that the reservoir is homogeneous in properties. Actually, reservoirs vary in characteristics. One variation commonly noted is the permeability. This may be shown, for example, by a permeability profile.

In many situations it has been found profitable to treat heterogeneity of permeability as though the reservoir were subdivided into parallel units each acting independently. It is assumed that there is no transfer in a vertical direction between units which differ in permeability. This treatment can be applied to solution-gas-drive reservoirs to permit the estimation of how heterogeneity will give deviation from the ideal behavior.

The individual permeability layers of the heterogeneous reservoir will deplete over different intervals of time because of their differences in permeability. All other things being equal, a reservoir of 1,000 md. will deplete faster than one of 10 md. If it is assumed that there is no vertical interaction between layers of the reservoir except at the well bore then the problem is the same as producing reservoirs in parallel, with each reservoir having identical solution-gas-drive performance characteristics excepting for the time over which depletion occurs.

Consider, therefore, that a reservoir has a solution-gas-drive depletion history as shown in Fig. 1. Let this reservoir be divided into two parts, of permeabilities k_1 and k_2, so that $k_1 > k_2$ and so that neither part can transfer fluid to the other.

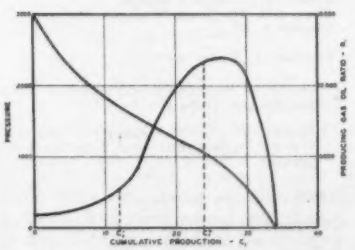

Fig. 1—Solution-gas depletion performance of individual permeability zones.

It has been shown (Engineering Fundamentals No. 410) that for two solution-gas-drive reservoirs producing in parallel the following condition must apply to the cumulative production and producing gas-oil ratios:

$$\int_0^{C_1} R_1 dC_1 + \int_0^{C_2} R_2 dC_2 = \int_0^{C_T} R_{AVE}\, dC_T \qquad (1)$$

where

R_1 and R_2 = producing gas-oil ratios on Reservoirs 1 and 2 respectively

C_1 and C_2 = cumulative productions

C_T = total cumulative production

R_{AVE} = composite producing gas-oil ratio

For the present case the relationship between R_1 and C_1 is the same as that between R_2 and C_2 but at any time the two individual reservoirs will have progressed to different points on the relationship. The equation is therefore written for this situation as:

$$\int_0^{C_1'} R_1 dC_1 + \int_0^{C_1''} R_1 dC_1 = \int_0^{C_T} R_{AVE}\, dC_T \qquad (2)$$

where

$C_T = C_1' + C_1''$

It becomes necessary to establish a variation between C_1' and C_1'', the limits reached at a given time. This is done through the permeabilities. As a first approximation one might say that the cumulative production from each permeability interval is directly proportional to the permeabilities. This would be:

$$\frac{C_1'}{C_1''} = \frac{k_1}{k_2} \qquad (3)$$

With a knowledge of k_1 and k_2, therefore, Equation 2 and the production history of Fig. 1 can be used to calculate R_{AVE} as a function of C_T. This has been done as shown in Fig. 2 for the conditions that $k_1 = 2k_2$, that each permeability zone contains the same total amount of oil in place, and that Fig. 1 applies to either zone.

This procedure does not give a composite pressure history. An average pressure could be calculated for the two zones at any stage of depletion by assuming that each zone contributed to an average pressure in proportion to the relative volumes of the permeability intervals.

This method could also be extended to any number of permeability intervals and to any relative volumes for the different permeability intervals. Also, other conditions can be set up to take the place of Equation 3. A more exact expression would be to make the cumulative productions proportional to the integrals of the productivity indices and pressure drops, the first of which could be evaluated as a function of the depletion history of the individual zone.

Note that Fig. 2 shows an irregular producing-gas-oil-ratio curve. Its irregularities would become smoother upon consideration of more permeability intervals.

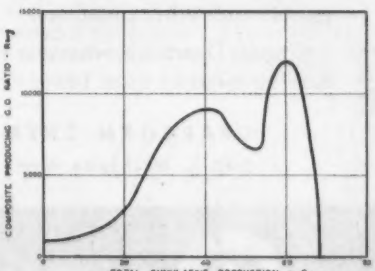

Fig. 2—Composite solution-gas-drive performance based on Fig. 1 for two permeability zones with $K_1 = 2K_2$.

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma

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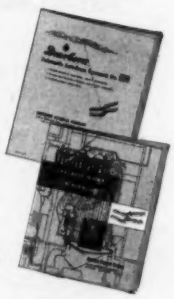

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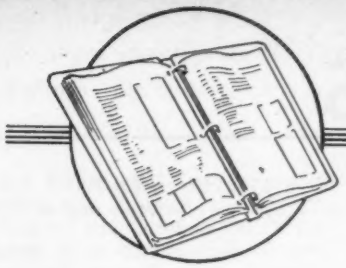

THE REFINER'S notebook

Pneumatic Transmission

CONTROL transmission systems may be (1) electric, (2) pneumatic, and (3) combination of electric and pneumatic. The pneumatic-control systems predominate in refinery-process control. Final control elements are ordinarily air-operated valves. The controllers themselves may be electric, electronic (vacuum tube), or air operated. The prevalence of hazardous atmospheres in the refinery was a main factor in the adoption of pneumatic systems by the petroleum industry for the control of temperature, pressure flow, and liquid level. Disadvantages inherent in the use of controllers located at a distance from the point of measurement led to the development of remote pneumatic transmission using a transmitter and receiver.

Transmitter-Receiver System

In remote pneumatic transmission a change in the value of the controlled variable as sensed by the primary measuring element is converted into a given value of air pressure in the transmitter. The latter is similar or identical in construction to the receiver. Either one of these units may act as an indicator, recorder, or controller, operating basically in the same way as described previously for pneumatic controllers (Refiner's Notebook, June 22, 1950). The output pressure from the transmitter is transferred through connecting tubing to the receiver where it is converted to a pointer or recording pen position or translated into a receiver output pressure for actuation of an air-operated control valve. The transmission line between transmitter and receiver is small-diameter (commonly ¼ in. o.d. by 3/16 in. i.d.) copper tubing.

Calibration of units.—The instrument companies have made available, over a number of years, transmitter units which operate to obtain a linear relation between output air pressure and the measured values of the controlled variable. A given pneumatic transmitter can be used with different receivers. Where the receiver gage calibration is also linear, the transmitter and receiver do not have to be calibrated together. Calibration of the transmitter in the actual installation is a simple operation. Provision is made for easy adjustment of transmitter output pressure range within the usual limits of 2 to 20 psi. Proportional band adjustment may be the same on both transmitter and controller. Transmitters are available with a linear calibration accurate to 1 per cent of the scale range. Since different receivers operate on the same pressure range they may be changed from one installation to another, as the need arises, for recording or control of any of the commonly controlled variables.

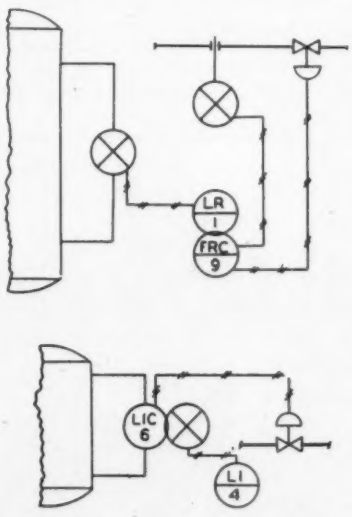

Fig. 1—(Top) Combined receiver, board mounted, with level record and flow-recording controller. (Bottom) Level-indicating transmitter-controller, board-mounted indicating receiver.

Features of Pneumatic Transmission

In remote transmission systems the transmitter is located close to the point of measurement. The receiver may be mounted on a central panel board or wherever convenient. By means of a locally mounted transmitter embodying the indicating or recording function performance of a process unit may be followed on the spot while at the same time retaining the advantages of a central panel board. Good response can be obtained with air-transmission tubing lengths of 500 or 600 ft. and this may sometimes be extended to 1,000 ft. Where capillary-bulb thermometers are used for temperature measurement, the high installation and maintenance costs associated with long length of capillary tubing are eliminated. This is also true in the measurement and control of pressure and flow where long lengths of pipe may be replaced by the small-diameter transmission tubing.

Features of the transmitter-receiver system may be summarized as follows: (1) Central control board installation is facilitated with elimination of explosion hazards and complex manifold piping in the control room. (2) Quick response. (3) Receiver controllers or recorders are interchangeable. (4) Multiple pen receivers may be used to record measurements from several transmitters. (5) Low initial and maintenance cost. (6) Recalibration not required when air transmission tubing breaks. (7) Additional indication or record obtained at or close to point of measurement. (8) Small space required by panel boards.

Transmitter-Receiver Combinations

Figs. 1 and 2 illustrate several pneumatic transmission combinations. Standard symbols as recommended by the ISA Subcommittee on Instrument Flow Plan Symbols are used.

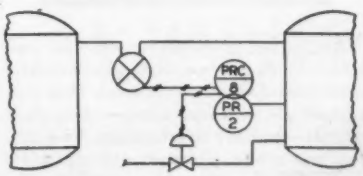

Fig. 2—Pressure-recording receiver-controller (differential) with pressure recorder, board mounted.

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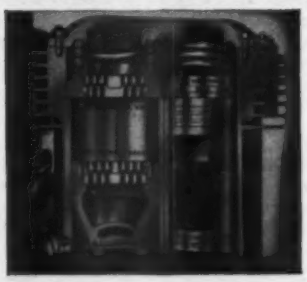

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PIPE LINES

Plantation Plans New Line

ATLANTA.—Another products pipe line, paralleling an existing line from Baton Rouge to Greensboro, N. C., is planned by Plantation Pipe Line Co. The line will be larger than the present line and will provide additional capacity to meet the needs of shippers, the company said.

Charles R. Younts, president, said that the line will get under way soon after January 1, 1951, or as soon as pipe becomes available. Capacity of the existing line is 95,000 bbl. daily.

Younts said that the new line is now only in the planning stage and is expected to be built and in operation by early 1952.

The present system of the company comprises 1,261 miles of line. The main line consists of 456 miles of 12-in. connecting Baton Rouge and Bremen, Ga., and 357 miles of 10-in. running from Bremen to Greensboro, N. C.

Texas Eastern Hearing Set

WASHINGTON.—A hearing will begin before the Federal Power Commission here July 17 on application of Texas Eastern Transmission Corp. and New York State Natural Gas Corp. for authorization to jointly acquire, develop, and operate underground storage facilities for natural gas in Westmoreland County, Pennsylvania. Under the proposal, Texas Eastern would build a 34-mile pipe line, and New York State Natural would construct a 70-mile line.

Total combined cost of the project is $38,752,769, or $20,385,877 for New York State Natural, and $18,366,892 for Texas Eastern. The properties in the Oakford storage area would be acquired from Peoples Natural Gas Co., affiliate of New York State Natural.

Carolina Hearing Under Way

WASHINGTON. — A consolidated hearing began here this week before the Federal Power Commission on four applications involving proposed natural-gas service to the Carolinas.

The applications were filed by Transcontinental Gas Pipe Line Corp., Houston; Piedmont Natural Gas Co., Inc., Spartansburg, S. C.; Public Service Co. of North Carolina, Inc., Gastonia, N. C.; and Carolina Natural Gas Corp., Charlotte, N. C. *(The Oil and Gas Journal, June 22, 1950, page 154).*

Public Service proposes to build a 365-mile system to serve 39 North and South Carolina areas, at a cost of approximately $7,046,000. Carolina Natural seeks authority to construct 375 miles of laterals at a cost of $7,374,100; Piedmont Natural seeks to build six short laterals totaling 74 miles of line, at a cost of $1,200,000; and Transcontinental is seeking authorization to install additional horsepower at existing compressor stations on its Texas-to-New York City pipe line in order to make gas available to Piedmont and Public Service for resale in the Carolinas. Carolina Natural has asked FPC to order Transcontinental to supply the firm with gas.

The combined markets proposed to

MID-VALLEY JOB.—Crew of Eastern Construction Co., Dallas, uses hoe to dig ditches on a steep bank at a creek crossing on Mid-Valley Pipe Line Co.'s 22-in., 1,000-mile crude-oil line from Texas to Ohio. A second hoe moves on its way to the bank on near side for a similar operation. (Photo courtesy of Thew Shovel Co., Lorain, Ohio).

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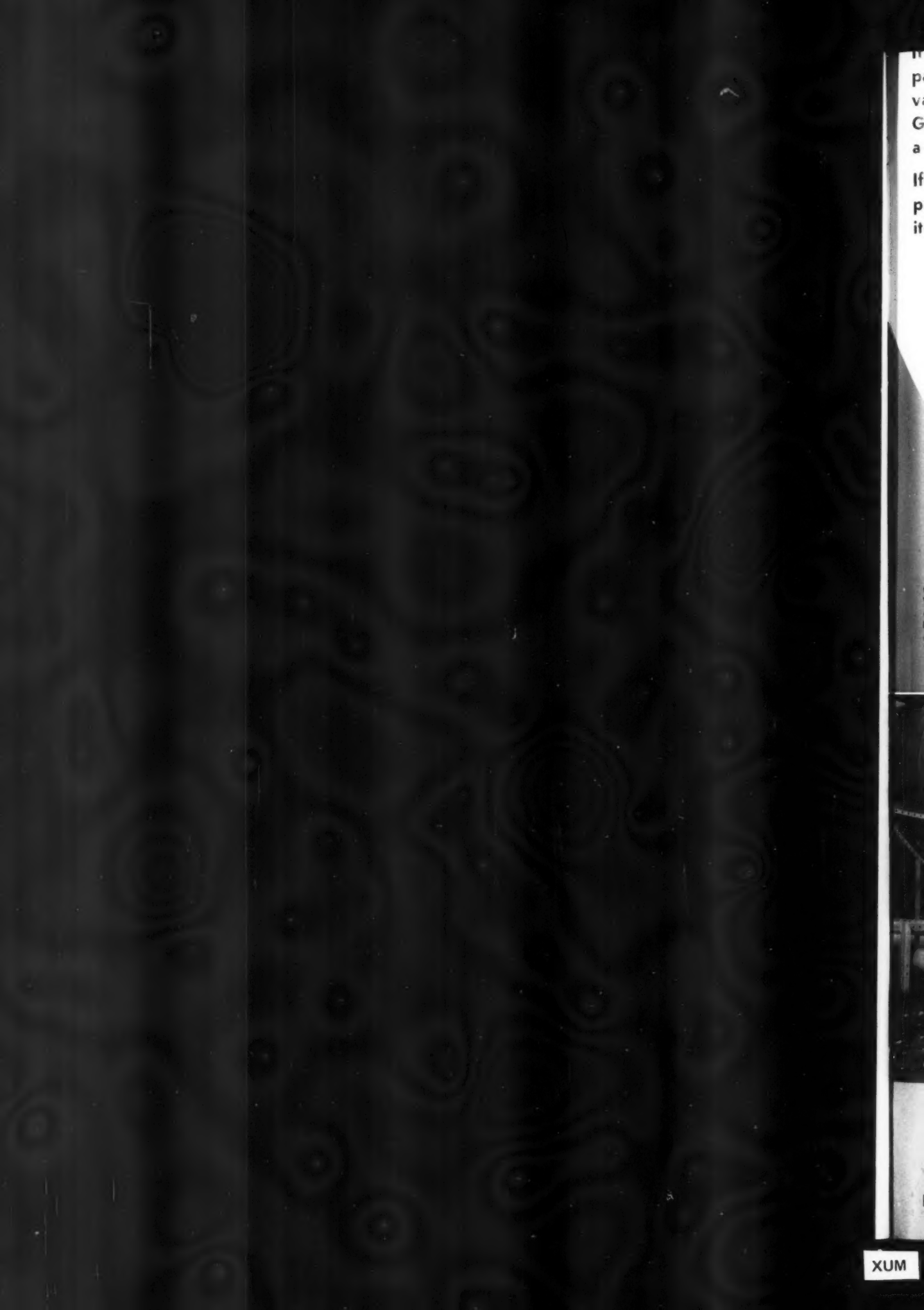

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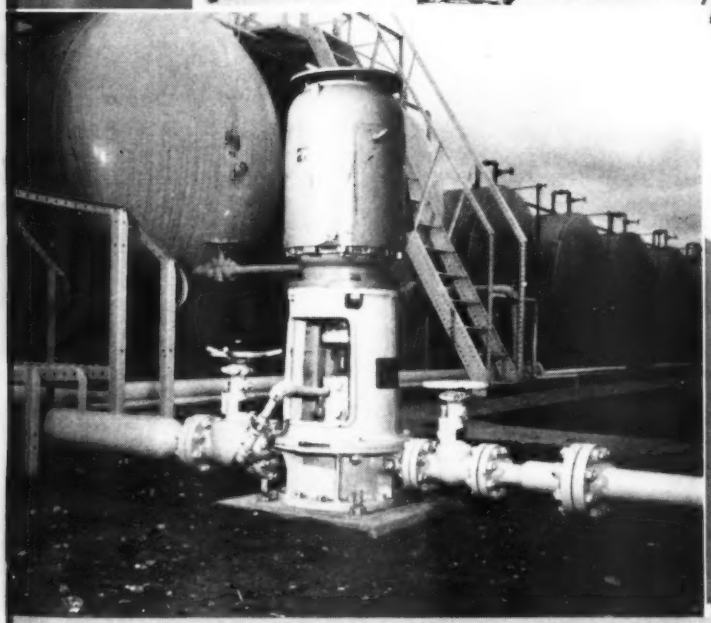

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be served by Piedmont and Public Service constitute substantially the market proposed to be served by Carolina Natural, FPC said.

Expansion Is Authorized

WASHINGTON. — A total of 41 miles of 20-in. loop lines, extending from North Means to Foster, Ky., has been authorized by the Federal Power Commission to be built by Central Kentucky Natural Gas Co., Charleston, W. Va.

In addition, the company will install an 880-hp. gas-engine-driven compressor unit at its North Means compressor station. The firm will use the new pipe-line facilities to provide increased requirements of its present markets.

Estimated cost of the pipe line and other facilities is $2,726,000.

United Files Proposal

WASHINGTON.—United Gas Pipe Line Co. has applied to the Federal Power Commission for permission to construct 16 miles of line, a compressor station, and a gas-dehydration plant in Louisiana, in order to augment supply of natural gas to its existing customers.

The proposed 16-mile, 16-in. line would run from United's Koran gasoline plant in Webster and Bossier parishes, Louisiana, to its Carthage, Tex.-Sterlington, La., line in Bienville Parish, Louisiana. Estimated over-all capital cost of the proposed project is $1,813,000.

Service Seeks to Build

CHEYENNE, Wyo. — Service Pipe Line Co., Tulsa (formerly Stanolind), has asked the Wyoming Public Service Commission for authority to construct a 24-mile, 8-in. crude-oil line in Freemont County, Wyoming.

The line would cost approximately $480,000, and would run from the company's trunk line between Pilot Butte and Lost Cabin, to the Beaver Creek oil field.

Hearings will be held at Riverton, Wyo., July 27. If permission is granted, Service will begin construction on the line August 14. Completion is expected by October 14.

Line Apparently Approved

WASHINGTON. — With the filing of an initial decision of approval, the Federal Power Commission apparently will authorize Texas Gas Transmission Corp. and Mayfield Gas Co. to construct pipe-line facilities which will make available up to 1,000,000 cu. ft. of gas daily in the Mayfield, Ky., area.

Estimated cost of construction is $3,434 for Texas Gas, and $48,500 for Mayfield.

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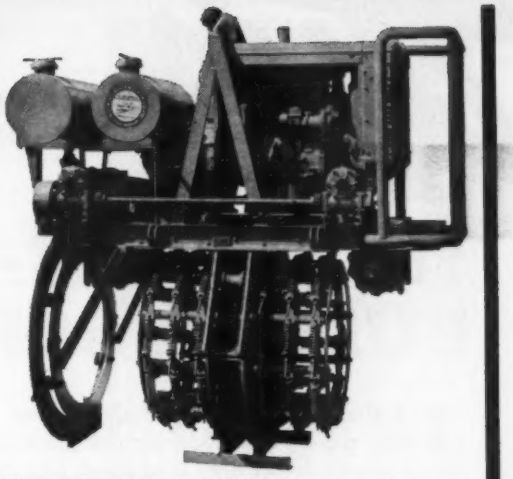

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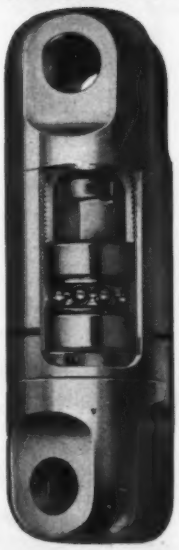

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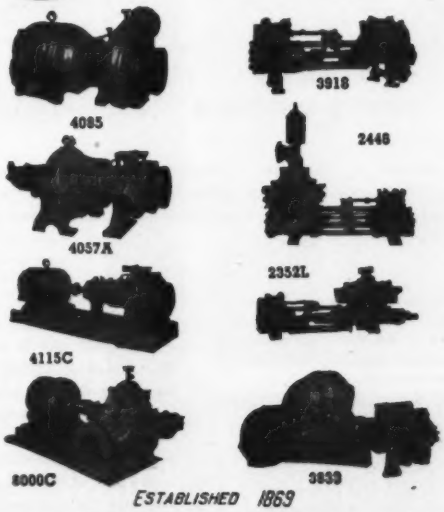

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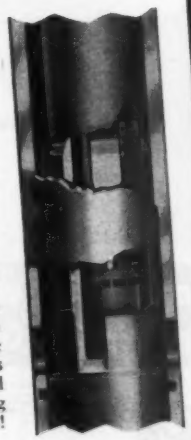

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- The Shaffer-Waggener Bumper Safety Joint has been used successfully in extreme directionally-drilled wells where a slant of 60° was maintained.
- The Shaffer-Waggener Bumper Safety Joint has been released and reconnected from a 30° angle at a depth of 8,500 ft.
- At 16,883 feet in the world's deepest well the Shaffer-Waggener Bumper Safety Joint proved invaluable in simplifying a recovery operation. A Bumper Safety Joint was being used between the drill collars and drill pipe when the string parted going into the hole, dropping over 2,400 feet of pipe and drill collars 5,000 feet to the bottom of the well at 16,883 feet. The top of the fish was gripped with a socket and the Bumper Safety Joint released, immediately recovering 2,100 feet of drill pipe. The upper part of the Bumper Safety Joint was then run back into the hole below a set of jars, reconnected to the lower half of the Bumper Safety Joint and—after jarring—the drill collars were completely recovered, leaving the hole clean.

Note: For maximum protection many operators are using the Bumper Safety Joint above wash-over strings to facilitate recovery should the string become stuck.

Whether used as a Bumper Sub or as a Safety Joint, the Shaffer-Waggener Bumper Safety Joint provides unique advantages found in no other tool—advantages too numerous to outline here but which are described in detail in a descriptive bulletin which will gladly be sent you on request. Send today for your free copy of this informative eight page bulletin!

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XUM

Pipe-Line Construction

FOLLOWING is a tabulation of domestic pipe-line projects which are planned or under construction. Included are crude-oil, products, and natural-gas lines. The list was compiled from surveys made by The Oil and Gas Journal.

Crude-Oil Pipe Lines

Humble Pipe Line Co.—371 miles, 18-in., under way, West Texas-Satsuma Station to Baytown, Tex.; 178-mile western section contracted to Morrison Construction Co.

30 miles, 8-in., Runnels and Coke counties, Texas, planned.

Lakehead Pipe Line Co.—320 miles, 18-in., Neche, N. D., to Superior, Wis.; Anderson Brothers Corp., contractor. K. B. Killingsworth, Pembina, N. D., Earl Saulsman, Clearbrook, Minn., and J. D. Jackquemine, Bemidji, Minn., spreadmen. Under construction.

Magnolia Petroleum Co.—60 miles 4-24-in. gathering system in La Ward and Lolita fields, Texas; Henry L. Lemons & Co., contractor; W. A. Remington in charge.

Mid-Valley Pipe Line Co. (Sun and Sohio)—1,000 miles, 20-22-in., under way, Longview, Tex., to Mayersville, Miss.-Covington, Ky., to Lima, Ohio. Contracts let for 857 miles as follows: Section 2, Haynesville, La., to Mayersville, Miss., completed. Section 3-A Mayersville to Oakland, Miss., Associated Pipe Line Contractors, Inc.; J. A. Williams and L. H. Gray, spreadmen; field office, Charleston, Miss.; Section 3-B 4-A, Oakland, Miss., to Henderson, Tenn., Houston Contracting Co., E. C. Norris, superintendent; field office, Batesville, Miss.; Section 4-B, 5-A, Henderson to Clarksville, Tenn., Eastern Construction Co.; work started April 1; to be completed by September 1, 1950. Louie Stewart and Cliff Simmons, spreadmen; field offices, Clarksville and Lexington, Tenn. Section 5-B, 6-A, Clarksville, Tenn., to Elizabethtown, Ky., field office, Clarksville, Fred L. Byers, superintendent; Britton Construction Co.; Section 6-B, 111 miles of 22-in., Elizabethtown to Hebron, Ky., H. L. Gentry Construction Co., Frank Morris and Jim Mitchell, spreadmen; field office, Warsaw, Ky., Section 7 South, Hebron, Ky., to Eaton, Ohio, Britton Construction Co., field office, Hamilton, Ohio; spreadman, Fred Peters; Section 7 North, Eaton to Lima, Ohio; Section 8, Magnolia, Ark., to Haynesville, La. Longview, Tex.-Haynesville, La., section, 110 miles 20-in., contracted to O. R. Burden Construction Co.; G. A. Lewis, spreadman; office, Marshall, Tex.

Cumberland and Tennessee rivers, Eastern Construction Co.; field office, Clarksville, Tenn., Fred L. Byers, spreadman.

41 miles, 20-in., Haynesville, La., to Red River near Benton La.; Latex Construction Co., contractor; H. L. Leake, superintendent; headquarters, Cotton Valley, La. W. A. Briley, assistant superintendent; Sam B. Harrison, office manager.

Naph-Sol Refining Co.—25 miles 6-in., under construction, Kimball Lake oil field, Newaygo County, Michigan, to refinery at Muskegon; Young Construction Co., Olney, Ill., contractor.

Pan American Pipe Line Co.—80 miles, 10-in., southern part of Scurry County, Texas, to connect with Humble Pipe Line Co.'s system near San Angelo, Tex. Brown & Root, contractor.

Pelican Oil Co.—60 miles, 6-in., Lake Charles, La., area; Anderson Brothers Corp., contractor; field office, De Quincy, La.; R. W. Jernigan, spreadman. Under construction.

Phillips Petroleum Co.—45 miles 2-24-in., gathering system near Andrews, Tex.; Vaughn & Taylor Construction Co., contractor; Jess Moore in charge.

281 miles 10-in., planned, Borger, Tex., to Yale, Okla.

Pasotex Pipe Line Co.—32 miles 4-8-in., authorized, North Snyder, Tex., lines for gathering, delivery to Basin System.

Portland Pipe Line Co., Montreal Pipe Line Co., Ltd.—236 miles, 18-in., planned, Portland, Me., to Montreal, Que., Canada, contracted as follows: Oklahoma Contracting Co., 85 miles in Section 1 at southern end; Portland, Me., to Gorham, N. H.; H. A. Wylie, superintendent; Lisle W. Chambers, paymaster; office, Barton, Vt.; work starts June 1. Associated Pipeline Contractors, Inc.; L. H. Gray, spreadman. Section 2, 81 miles; and Fred Mannix Co., Ltd., 68 miles, Section 3, in Canada.

Richfield Oil Corp.—40 miles, 10-in., Cuyama Valley-Newhall, Calif., planned. 60 miles, 14-in., applying field joints, Newhall-Wilmington, Calif., under way.

Stanolind Pipe Line Co.—36 miles, in Kent County, Texas, outlet for Scurry County crude.

Texas-Empire Pipe Line Co.—42 miles, 16-in., authorized, Wilmington, Ill., to East Chicago, Ind.; O. E. Burden Construction Co., contractor; Pete Hiner, spreadman; office, Wilmington, Ill.

Texas Pipe Line Co.—42 miles 12¾-in., Patoka, Ill., to Clay City, Ill.; L. R. Young Construction Co., contractor; field office, Flora, Ill.: Whity Ralph, spreadman.

Texas-New Mexico Pipe Line Co.—37 miles, 10-in., proposed, Scurry County, Texas.

Products Pipe Lines

Great Lakes Pipe Line Co.—261 miles, 12-in., under way; contracted as follows: 52 miles, 15-in., Albert Lea to Fairbault, Minn.; under construction; Sheehan Pipe Line Construction Co., contractor; field office, Albert Lea, Minn.; C. W. Henderson, spreadman. 50 miles 12-in., St. Paul to Fairbault, Minn.; J. W. Brown, spreadman; office, Northfield, Minn. 50 miles 12-in., State Line to Fairbault, Minn., C. M. Brown, spreadman; office, Albert Lea, Minn. O. R. Burden Construction Co., 64 miles north from Des Moines; field office, Nevada, Iowa; G. D. Lewis, spreadman; A. C. Holder Construction Co., 72 miles to Iowa-Minnesota state line; Williams Brothers Corp., 20 miles, Mississippi River crossing and line to terminal and station. Kansas and Missouri river crossings, R. H. Fulton & Co.; field office, Kansas City; Ed Veach, spreadman.

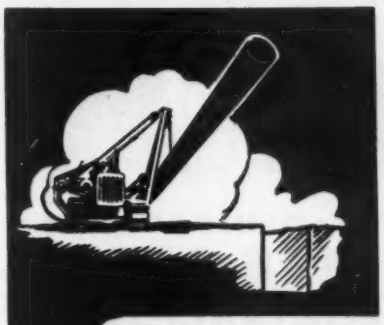
Second 12-in. line to be constructed between Barnsdall, Okla., and Kansas City, Kans., paralleling the 12-in. recently completed, and three existing 8-in. lines. Work to start as soon as pipe is delivered.

47 miles, 12-in., Atchison, Kans.,-Fall City, Neb.; Midwestern Constructors, Inc., contractor; field office, Falls City. This firm has following contracts, also: 47 miles, 12-in., Falls City to Nebraska City; field office, Nebraska City; and 48 miles, 12-in., Nebraska City to Omaha; field office, Plattsmouth, Neb.

290 miles, 12-in., Tulsa to Kansas City, Mo. Contracted as follows: 54 miles, Ponca City to Barnsdall, Okla., O. R. Burden Construction Co.; and 236 miles, Barnsdall, Okla.-Kansas City, Mo., Pacific Pipe Line & Engineers, Ltd. James Howe, superintendent for Pacific Pipe Line portion is headquartered at Chanute, Kans.; spread office at Tulsa with Ham Hamilton general spreadman and river-crossing spreadman; spread office at Dewey, Okla., Loue Robertson, spreadman; and spread office at Paola, Kans., Larry Webb, spreadman.

355 miles, 12-in., authorized, Kansas City through Omaha and Sioux City, Iowa, to Sioux Falls, S. D.

189 miles, 12-in., authorized, Kansas City



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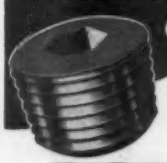

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STANDARD PRESSED STEEL CO.
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to Des Moines, contracted as follows: 36 miles 12-in., Kansas City, Mo., northward through Platte, Neb.; Trojan Construction Co., contractor; field office, Parkville, Mo.; Swede Tillotson, spreadman; 37½ miles, 12-in. Clay, Clinton, DeKalb, and Daviess counties, Missouri; Trojan Construction Co., contractor; field office, Cameron, Mo.; Felix Johnson, spreadman; Brodie Construction Co., 37-mile middle section; field office, Bethany, Mo.; A. T. Rathjen, spreadman; R. H. Fulton & Co., two 38-mile northern sections, Osceola to Des Moines, Iowa; Jerry Nash, spreadman; office, Osceola.

48 miles, 8-in., authorized, Cushing-Drumright-Tulsa, Okla.; Trojan Construction Co., contractor; field office, Sapulpa, Okla.; Slim Deaver, spreadman.

Phillips Petroleum Co.—155 miles 6-in., extension to present 200-mile line from Phillips, Tex., to LaJunta, Colo., on to Denver.

Standard Oil Co. (Ohio).—38 miles 8-in., authorized, Toledo to Fostoria, Ohio.

Salt Lake Pipe Line Co.—242 miles, 6-8-in., Boise, Idaho-Pasco, Wash., planned. Contracted as follows: Morrison-Knudson Co., Inc., Macco Corp., and Bechtel Corp., 140-mile section from Boise to Baker, Idaho; Pacific Pipeline & Engineers, Ltd., Baker to Pasco, Wash. Pacific Pipeline & Engineers, Ltd.'s, field office, LaGrande, Ore.; L. E. Robertson, spreadman.

63 miles 8-in., Mountain Home to Boise, Idaho; Oklahoma Contracting Corp., contractor; Aldress Kilgore, supt.; R. F. Mueller, paymaster. Office, Mountain Home. Construction under way.

Tuscarora Oil Co. (Esso).—360 miles, 10-12-in., Linden, N. J., to Pittsburgh; replacement of present line.

Natural-Gas Pipe Lines

Alabama-Tennessee Natural Gas Co.—80 miles 10-in., under way, Selmer, Tenn., to Muscle Shoals, Ala.; 35 miles 8-in., authorized, Muscle Shoals to Decatur, Ala.

Algonquin Gas Transmission Co. — 276 miles, Lambertville, N. J., to Boston area, proposed.

492 miles laterals, New England area, proposed.

Arkansas-Louisiana Gas Co.—69 miles, 20-in., Waskom, Tex., to Magnolia, Ark.; under construction; Anderson Brothers Corp., contractor; Ralph Pitts, spreadman; field office, Plain Dealing, La.

Associated Pipe Line Co.—35 miles, 14½, 8⅝-in., in southeastern Missouri, approved.

Atlantic Gulf Gas Co. (United Gas Pipe Line Co.)—1,530 miles, planned, Alabama-Florida-Georgia-South Carolina.

Central Hudson Gas & Electric Corp.—40 miles, authorized, Tuxedo, N. Y., station. Home Gas Co. line now under construction, to Poughkeepsie, N. Y. Britton Construction Co., contractor; field office, Newburgh, N. Y.; spreadman, Curley Hahn; R. L. Carlton, office.

Central Kentucky Natural Gas Co.—36 miles, 12-20-in., planned, Kentucky loops.

Chicago District Pipe Line Co.—41 miles, 24-in., planned, Joliet, Ill., to Chicago.

City of Indianapolis, Ind., Inc.—55 miles 16-in., proposed, Indianapolis to Texas Eastern Transmission Corp.'s system.

Cities Service Gas Co.—47 miles, 3-4-16-in planned, in Kansas.

Coastal Pipe Line Co.—1,000 miles, planned, Texas to Norfolk, Va.

Colorado-Wyoming Gas Co.—41 miles, planned, Greeley, LaSalle, and Windsor, Colo., areas. Vaughn & Taylor Construction Co., has contract for 30 miles, 10-in., Mesa to Boulder Junction, Colo.; field office, Derby, Colo.; Don Smith, spreadman.

Commonwealth Natural Gas Corp.—537 miles, 20-in., planned, West Bend, Ky., to Norfolk, Va.

200 miles, authorized, Green County, Virginia, to Norfolk.

East Tennessee Natural Gas Co. — 185 miles, 16-in., Lobelville-Chattanooga, Tenn., contracted by Walters & Saigh Construction Co., for construction in 1950; 120 miles, 12-in., Chatanooga-Knoxville, Tenn.; contracted by Walter and Saigh Construc-

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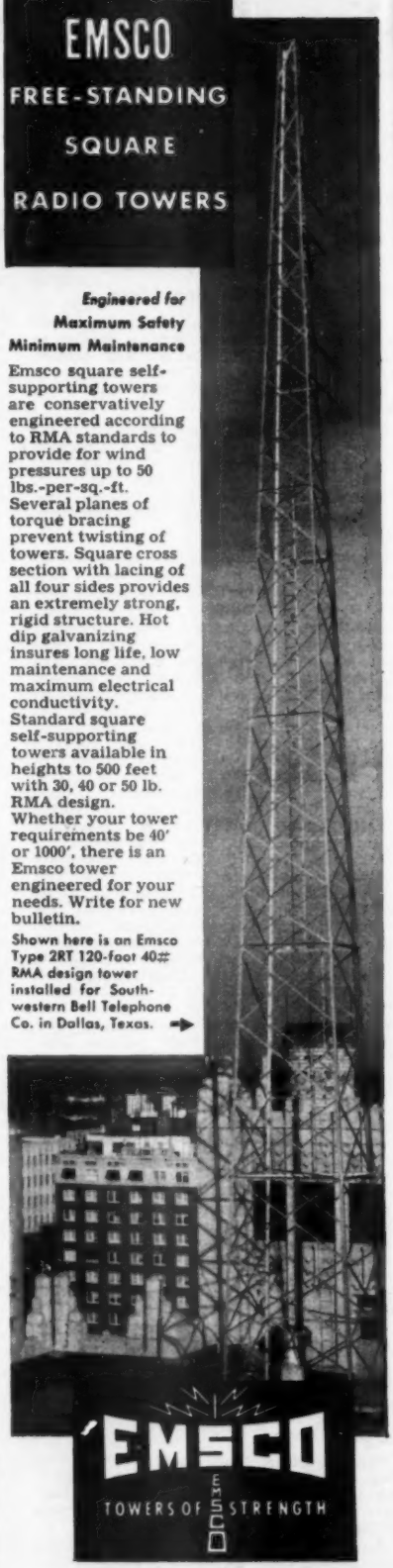

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tion Co., for construction in 1950; Robert E. Floyd, spreadman; field offices, Athens and Cleveland, Tenn.; Carl Doyle, general superintendent; James E. Gray, office manager; 100 miles of laterals to be laid in 1950. Construction 150 miles, 16-in., Knoxville-Bristol, Tenn., under consideration.

El Paso Natural Gas Co.—All work done by company crews.

Looping of 26-in., New Mexico-California line and connection with Pacific Gas & Electric Co. at Needles, Calif. 352 miles. 30-in., completion November 1950; spreads as follows: 119 miles 30-in., Wenden to Topock, Ariz., Ed Alsup, spreadman; office, Salome, Ariz.; (Spread No. 2 is shut down due to lack of pipe; office, Jal, N. M., Jack Smith, spreadman); 15 miles 2-in., Bowie, Ariz.; G. George, spreadman.

450 miles, 30-in., under construction. Eunice, N. M.-Blythe, Calif., looping; completion March 1950.

450 miles, 24-in., planned, San Juan basin, New Mexico to Franconia, Ariz.

Home Gas Co.—70 miles, planned, Orange, Sullivan-Rockland counties, New York-Cattaraugus County, New York, areas.

Jersey Central Power & Light Co.—39.4 miles, 10-in., planned, New Jersey to Coast system, Texas Eastern Transmission Co.'s Big Inch.

Michigan-Wisconsin Gas Co.—185 miles. 4-14-in. laterals, Milwaukee-Fond du Lac, Sheboygan, and Green Bay, Wis., under construction; C. C. Griffis Construction Co., contractor; Paul Means, superintendent for Lake Del Mort crossing.

Montana-Dakota Utilities Co. and Montana-Wyoming Gas Pipe Line Co.—340 miles, 12¾-in. under way, Worland, Wyo., to Cabin Creek, Mont.; R. A. Conyes Construction Corp., contractor; Al Poggi, general superintendent; Chester Kincaid and Jimmy Alman, spreadmen; field office, Hardin, Mont.

Montana Power Co.—83 miles, 12¾-in., planned, Butte to Bozeman, Mont.; field office, Three Forks, Mont.; C. N. Deaton, spreadman.

New York State Natural Gas Corp.—53½ miles 16-in., loops, Pennsylvania.

164 miles, 16-in., Ithaca to Albany, N. Y., planned.

70 miles, 20-in., North Oakford storage pool, Pennsylvania, to Ohio State line.

53 miles, 16-in., loops in Pennsylvania, under construction.

56 miles, 20-in., loops in Pennsylvania and New York; under construction.

Northeastern Gas Transmission Co.—511 miles, up to 20-in., planned, in New England area

Northern Natural Gas Co.—41 miles, 20-in., under construction, Southwest from Garden City, Kans.; R. H. Fulton & Co., contractor.

597 miles of looping in 10 sections, contracted as follows: R. H. Fulton & Co., loops 1 to 5: loop 1, 40.2 miles, 26-in., extending northward from a point 28.7 miles north of Skellytown station in Pampa, Tex., area; loop 2, Beaver, Okla., station, 74.9 miles, 26-in.; loop 3, Mullinville, Kans., station, 33¼ miles, 26-in.; loop 4, Bushton, Kans., station, 72½ miles, 26-in.; loop 5, from a point west fo Garden City, Kans., to Bushton, Kans., station, 155 miles, 20-in. M. L. Boyd, spreadman; office, Perryton, Tex.; and N. A. Veach, spreadman; office, Liberal, Kans. Midwestern Constructors, Inc., loops 6 and 7; loop 6 from a point 29 miles northeast of Palmyra, Nebr., station, 43.4 miles, 26-in., to Oakland, Iowa, station; loop 7, from a point 17.8 miles northeast of Oakland, Iowa, station, 65.9 miles, 26-in; office, Glenwood, Iowa. R. B. Potashnick, loops 8 to 10; loop 8, southwestward from Ventura, Iowa, station, 31.2 miles, 26-in.; loop 9, northward from Ventura station, 41 miles, 26-in.; loop 10, from the north end of a 26-mile gap beyond loop 9, where another loop will be built consisting of 39½ miles, 26-in.; total 111 miles, 24-in.; field office to be located at Ogden, Iowa, June 1; Boyd, spreadman.

Northwest Natural Gas Co.—750 miles planned; Washington Oregon, and Idaho.

Pacific Gas & Electric Co.—506 miles 34-in., under construction, Topock, Ariz.-Milpitas, Calif.; Bechtel-Price-Conyes, contractor; main-line office, Barstow, Calif.; R. L. Bowman, general superintendent.

Panhandle Eastern Pipe Line Co.—160 miles, additions to present system; approved. Also, 188 miles to be built in conjunction with the 160-mile project, along entire system. (Previously approved by FPC.)

69 miles 26-in. loops, Olpe to Hugoton, Kans.; Midwestern Constructors, Inc., contractor; office, Ottawa, Kans.; M. L. Wilhite, superintendent.

Panhandle Eastern Pipe Line Co.—356 miles, 26-in., authorized, looping in Texas, Oklahoma, Kansas, Missouri, Illinois, Indiana, Ohio, and Michigan.

75 miles, 26-30-in., loops in Illinois, Indiana, Missouri; Anderson Brothers Corp., contractor; field office, Rockville, Ill.; J. A. Brown, spreadman; office at Winchester, Mo.; Dewey Whitworth, spreadman. Under construction.

Peoples Gas Light & Coke Co.—Planned 42 miles, 24-in., Joliet-Chicago, Ill.

Phillips Petroleum Co.—25 miles gathering system in West Edmond, Okla., field; under construction; Vaughn & Taylor Construction Co., Inc., contractor; spread office Edmond, Okla.

118 miles, 3-to-20-in., gas-gathering system in Sherman and Hansford counties, Texas; Vaughn & Taylor Construction Co., Inc., contractor; D. D. Vaughn, spreadman; field office, Texhoma, Okla.

Phillips Petroleum Co.—118 miles 3-26-in., gas-gathering system, Sherman and Hansford counties, Texas; Vaughan & Taylor Construction Co., Inc., contractor; field office, Texhoma, Okla.; D. D. Vaughn and Jess Moore, spreadmen. Work 60 per cent complete.

Piedmont Natural Gas Corp.—1,350 miles, 20-in., planned, Greenville, Miss., to Norfolk, Va.

Plains Natural Gas Co.—78 miles, gathering system, Oklahoma-Kansas area, Hugo-

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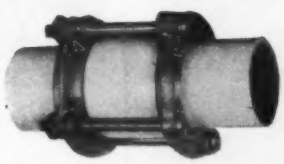

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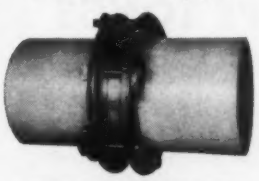
Styles 4 and 41, for repairing and preventing leaks through threads of screw collars.

BAND CLAMP

Style 77B, for repairing small leaks and holes in the run of pipe.

SPLIT REPAIR CLAMP

Style 79B, for repairing pitholes and longitudinal splits in pipe.



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Style 55, for repairing circumferential weld leaks.

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Swampland construction for 20" line in North Louisiana . . by LATEX in 1949.
Latex CONSTRUCTION COMPANY
General Contractors
Oil Gas Gasoline Water Pipelines
HOUSTON, TEXAS ATLANTA, GA.
L. H. Favrot — G. A. Peterkin —
J. W. Sharman — R. P. Gregory

ton field. Contracted by: Arey-Phillips Construction Co., Amarillo, Tex.; Tulsa Pipe Coating Co., Mid-Western Constructors, Inc., Engineering and supervision. Latter firm represented by Lyle DeWitt; field office, Liberal, Kans.

Roanoke Pipe Line Co.—30 miles 8-in., Gala, Va., to Roanoke, authorized.

South Jersey Gas Co.—77 miles, planned, Camden to Atlantic City.

Southern California Gas Co.—80 miles 30-in., Whitewater to Puente, Calif., under way; field office, Bonning, Calif.

Southern Natural Gas Co.—Following program approved by FPC (Docket G-1308): scheduled for 1950.—180 miles, 18-in., Gwinville, Miss., to Selma, Ala.; Sheehan Pipe Line Construction Co., contractor; 26 miles, 16-in., Selma to Marvin Gate, Ala.; 29 miles of 12-in., Carthage, Tex., to Logansport, La.; 14 miles, 14-in., Logansport to Perryville, La.; 5.8 miles of 8-in., Carthage field, Texas; 13.2 miles, 24-in., Benton-Pickens loop in Louisiana; 4 miles, 24-in., Coosa-Talladega loop, in Louisiana; 4 miles, 24-in., Tallapoosa-Bowden loop in Louisiana; 11 miles of 6-in., Vicksburg loop in Mississippi; 6.2 miles, 12-in., Macon line loop, in Georgia; and the following connecting lines: 5 miles, 8-in., Meridian, Miss.; 1 mile, 8-in., Demopolis, Ala.; 35 miles, 8-in., La Grange, Ga.; 6.3 miles, 6-in., Lanett, Ala.; 6.2 miles, 8-in., Mississippi Chemicals Co. plant; 22 miles, 8-in., Childersburg, Ala.; 2 miles, 6-in., Beaunit Mills; and 12.6 miles, 12-in., Yates plant.

Scheduled for 1951.—45.6 miles, 18-in., and 22.9 miles, 16in., Selma to Marvin Gate, Ala.; 98.1 miles, 16-in., Marvin Gate to Bolingbroke, Ala.; 105 miles, 10-in., Bolingbroke Gate to Augusta, Ga.; 19 miles, 8-in., Augusta to Aiken, Ga.; 27.2 miles, 14-in., and 36.9 miles, 14-in., Logansport to Perryville, La.; 21.4 miles, 24-in., Perryville-Pioneer loop in Louisiana; 14.4 miles, 24-in., Onward Big Sunflower loop, in Louisiana; and the following connecting lines: 18.8 miles, 6-in., Grandville, Ga.; and 15.5 miles, 4-in., Sandersville, Ga.

Southern Union Gas Co.—78 miles, 8-10-14-in., planned, New Mexico loops and laterals.

Tennessee Gas Transmission Co.—65 miles, 16-in., planned, Ohio-Pittsburgh spur.

40 miles, 16-in., Beaver Falls-Pittsburgh, Pa., Britton Construction Co., contractor; office, Beaver Falls; Fred McKenzie, superintendent.

790 miles, 20-26-in., planned, Burnaugh, Ky., to Boston, including 400-mile line to Buffalo.

992 miles, 30-in., planned, first 150 miles of loops to be laid at Monroe, La., Greenville, Miss., Midland and Portland, Tenn.

385 miles 26-in., Greenup County, Kentucky, to New York; contracted to H. C. Price Co., Bartlesville, Okla.

Latex Construction Co. has following contracts: 123 miles, 30-in., West Monroe to Many, La., W. H. Hayes, superintendent, field office, Jonesboro, La.; 95 miles, 30-in., Natchitoches to Kinder, La.; F. A. Silar, superintendent, W. A. Briley, assistant; field office, Kinder, La. 75 miles, 16-in., Kinder to Bayou Sale, La., F. A. Silar, superintendent.

54.2 miles, 30-in., under construction, White Bluff area to Joelton, Tenn., area, contracted to Morrison Construction Co.

36.1 miles, 30-in., under construction, Glasgow, Ky., area to Joelton area, contracted to Morrison Construction Co.

18.1 miles, 30-in., under construction Union City to Buckeye, Ky., Anderson Brothers Corp., contractors.

47 miles 30-in., Glasgow to Lebanon, Ky.; H. C. Price Co., contractor; field office, Scottsville, Ky.; R. L. McMillon, spreadman.

99 miles 30-in., under way, Dickson to Selmer, Tenn.; field office, Dickson, Tenn.; Jack Hodges, spreadman.

63 miles 26-in., Mahoning River near Youngstown, Ohio, southward; H. C. Price Co., contractor; G. A. Reutzel, supt.; field office, Columbiana, Ohio. 63 miles 26-in., Muskingum River northeastward; R. K. Shivel, supt.; office, Zanesville, Ohio; 47 miles 26-in., Muskingum River southwest-

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1. *"We purchased our first Cooper — Allis-Chalmers W201-26 Single Drum Skid in September, 1946.* This proved to be an ideal unit for servicing this area, most 2000' - 3000' with 2" and 2½" tubing. Did numerous rod jobs and some tubing jobs to 4150' with the unit."

2. *"We purchased the second W201-26 Double Drum Skid in August, 1948.* This unit was so well received by our customers that we also equipped our first W unit with a second drum. We did considerable bailing and swabbing, as well as rod and tubing jobs with these machines pulling over a Cooper 50' Single pole mast. 4000' round trip rod jobs were done in 5 to 6 hours well time, and 2500' to 3000' round trip and rod tubing jobs laid down in 8 to 9 hours well time."

3. *"Our third unit was a Cooper Model M318-32 Double Drum Skid, purchased in April, 1949.* This unit has air controls and Cooper 65'-2 pole mast. We use this unit primarily on 4000'-4500', but have pulled 5400' of 2" and 2½" upset tubing, and Kobe strings in the 4500' range. Round trip on 4000' rod and tubing jobs, 2½" upset tubing and ¾" rods laid down, average 12 hours well time."

4. *"Our fourth, a Cooper Model E563-36 Double Drum Skid equipped with Air Controls and Cooper 65'-2 pole mast, was purchased in March this year.* This unit is capable of handling 6000', wet strings, of 2½" upset tubing."

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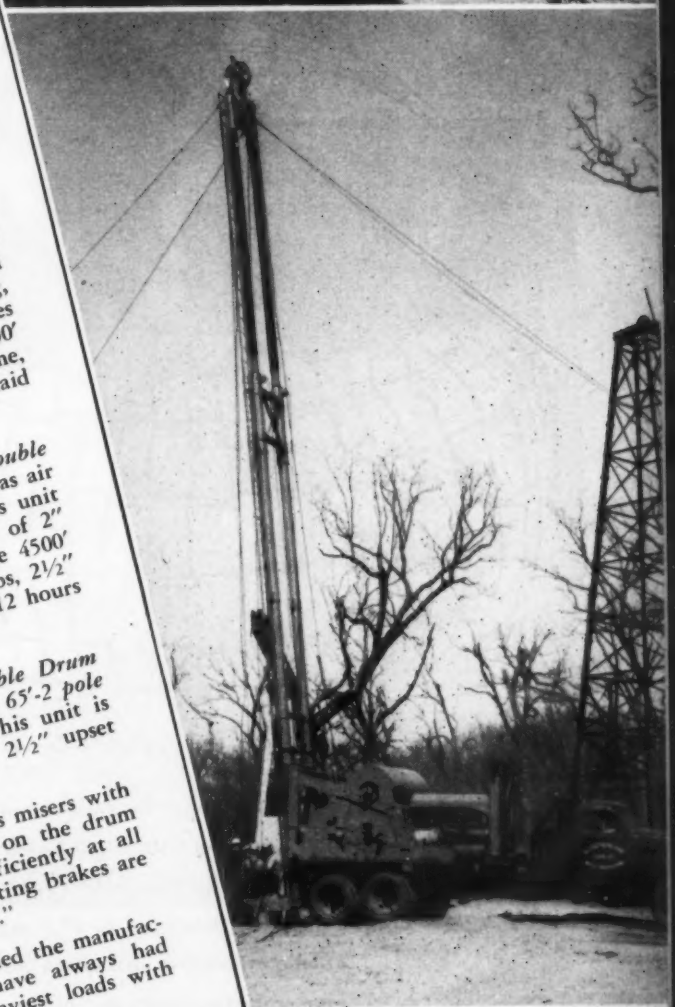
"Even though we have considerably exceeded the manufacturer's recommendations at times, we have always had ample braking power to control the heaviest loads with ease and safety."



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ward; W. B. Williams, supt.; office, McConnelsville, Ohio; 47 miles 26-in., Ohio River northeastward; C. R. Ice, supt.; office, Portsmouth, Ohio. (Balance of 373-mile Ohio River-Buffalo project to be started in August 1950.)

27.7 miles, 12-in., under construction, El Campo, Tex., to near Traitor, Tex.; Massey Construction Co., contractor.

25 miles, 30-in., Hardeman and McNairy counties, Tennessee; H. C. Price Co.; field office, Selmer, Tenn.; J. A. Reutzel, spreadman.

174 miles, 30-in. loops in western Tennessee and Kentucky; Price-Morrison, contractor; R. L. McMillon, spreadman; office, Scottsville, Ky.; Jack Hodges, spreadman; office, Dickson, Tenn.

103 miles 30 and 26-in. loops, Premont to El Campo, Tex.; Oklahoma Contracting Corp., contractor; M. E. Shiflett, supt.; Joe Freeman, paymaster. Work under way.

60 miles, 30-in., between stations 104 and 99; Anderson Brothers Corp.; field office, Richmond, Ky.; A. G. Hobson, spreadman. 65 miles, 26-in., Station 110 to Ohio River; field office, Moorehead, Ky.; E. C. McCoy, spreadman.

170 miles of 26 and 30-in., contracted by Anderson Brothers Corp., in Kentucky

91 miles 30-in., Holly Springs, Miss., south; contracted to Oklahoma Contracting Corp.; Raymond Law, supt.; Gene Gohring, paymaster; office, Holly Springs; work to begin June 1.

Texas-Eastern Transmission Corp.—1,400 miles planned, Texas to Pittsburgh loops.

108 miles 16-in., authorized, Provident City to Baytown, Tex.

Texas Gas Transmission Corp. — 103 miles, 20-in., Carthage, Tex., to near Lisbon, La., (Sharon); under construction. N. A. Saigh Co., Inc., contractor; Carthage, Tex.; Bob Floyd, representative. Construction subcontracted: (1) Fowler Brothers, 43 miles from Carthage to Red River, field office at Carthage; M. C. Johnson, spreadman; (2) 63 miles to Sharon station, Oklahoma Contracting Co. (J. R. Horrigan) field office at Minden, La.; Ed Flanagan, spreadman.

32 miles, planned, Slaughters, Ky., to Evansville, Ind.

Texas Illinois Natural Gas Pipeline Co. 1,400 miles, 30-in., approved, La Gloria field, Texas, to Joliet, Ill.

58-mile, 20-in. lateral, Joliet terminal to connection with Natural Gas Pipeline Co of America near Volo, Ill.

Transcontinental Gas Pipe Line Co.—Texas-New York 1,840 miles, 30-in., main line and 500 miles, 4 to 22-in., gathering line. Section of 605 miles of 30-in. nearing completion.

Section 6, Newman, Ga., to Danielsville, Ga., 108 miles; Williams Brothers Co.; field office, Monroe, Ga.; Thelmer Davis, spreadman. Section 7, Danielsville, Ga., to Saluda River, South Carolina; 86 miles; Williams Brothers Co. Section 8, Saluda River, South Carolina, to Catawba River, North Carolina, 102 miles; R. H. Fulton & Co. Section 9, Catawba River, North Carolina, to North Carolina-Virginia boundary, 100 miles; Clark Williams, spreadman; field office, Spartanburg, S. C. R. H. Fulton & Co.; A. A. Corrigan, supt.; Clark Williams, general supt. Section 10, North Carolina-Virginia boundary to James River, Virginia, 86 miles; O. R. Smith Contracting Corp. Section 11, James River, Virginia, to Potomac River, Virginia; 110 miles; O. R. Smith Contracting Corp. Section 12, Potomac River, Virginia, to Susquehanna River, Pennsylvania, 76 miles; Associated Engineers & Contractors, Inc., spreadman, Cecil Rogers; field office, Towson, Md.; Section 13, Susquehanna, Pennsylvania, to Delaware River, 90 miles; Wunderlich & Griffis Construction Co. Section 14, Delaware River to Hackensack River, New Jersey, 61 miles; Wunderlich & Griffis Construction Co. Section (unnumbered), Hackensack River, New Jersey, to Hudson River, New York, 23 miles; Oklahoma Contracting Co.; field office, Edgewater, N. J.; M. E. Shiflett, spreadman.

616 miles main and gathering lines west

(Continued on page 141)

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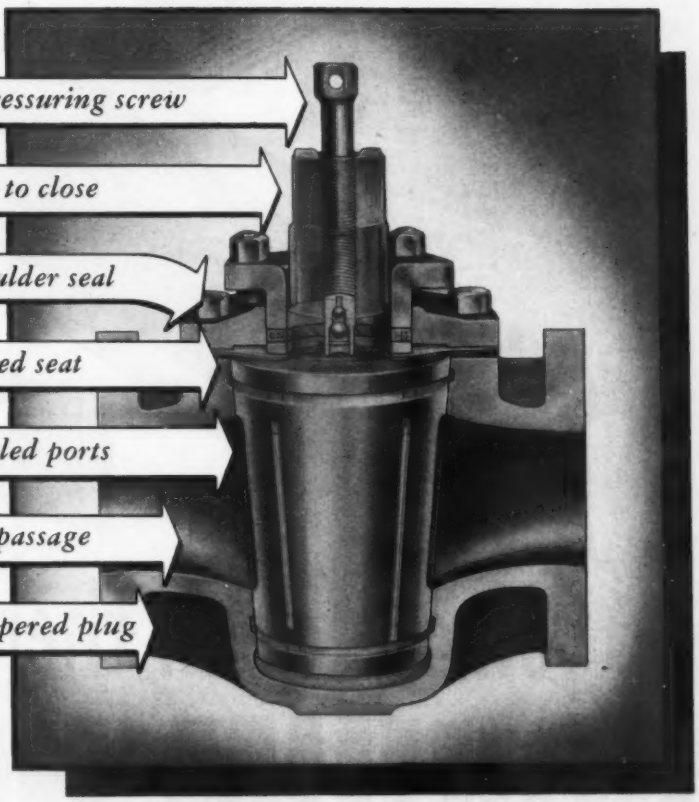

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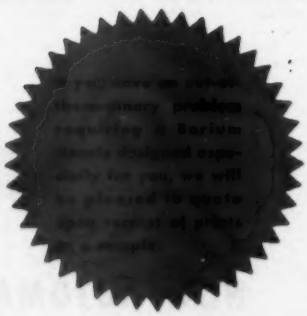

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Among the Drilling Contractors

Noble Tools to Drill Salina Basin Wildcat

Noble Drilling Co., Tulsa, has been awarded the contract for a rank wildcat test which Stanolind Oil & Gas Co. is undertaking in Cloud County, North Central Kansas. The location, 12 miles southeast of Concordia, in the SW NW NW 26-6-2w, is in the middle of the wide-open Salina Basin. Nearest production is 50 miles to the south in Salina County. The test will be 1 Campbell.

Number of Active Rigs Continues to Increase

Drilling activity in the United States and western Canada continued to increase during the week ended July 3 (latest survey), boosting the total number of operating rotary rigs in these regions to a new record level for the past year and a half. Active rotary rigs in these regions during that week totaled 2,329, an increase of 17 over the previous week's record level.

Increases were reported in all areas except West Texas-New Mexico and Oklahoma. In the former area, 14 fewer rigs were making hole than during the previous week. The Oklahoma number, already at the highest level on record, was unchanged.

There were 265 more rigs running than there were at the same time a year ago. Operating rigs by areas follow:

ROTARY RIGS IN OPERATION
(United States and Western Canada)

Area—	Week ended 7-3-50	Change week ended 6-26-50	Change week ended 7-4-49
Gulf Coast	522	+11	— 24
W. Tex.-N. M.	730	—14	+219
Ark.-N. La.-E. Tex.	152	+ 2	— 11
Oklahoma	313	0	+ 78
Kansas	135	+ 1	+ 9
Illinois-Eastern	153	+ 2	+ 35
Rocky Mountains	106	+ 8	— 6
Pacific Coast	131	+ 2	— 57
Total U. S.	2,242	+12	+243
Western Canada	87	+ 5	+ 22
Total	2,329	+17	+265

*Courtesy Hughes Tool Co. Trends in drilling activity for the United States and the California and Illinois-Eastern areas are shown by graphs on pages 142 and 143.

Quaker Tools Uncover New Kansas Oil Pool

Quaker Drilling Co., Wichita, has another oil discovery well for its credit. Its tools drilled Alpine Oil & Royalty Co. 1 Kowalski, now being tested to open a new pool in the Ellinwood area, Barton County, Kansas. Location, in the SE SE NW 20-19-11, is 1½ miles from nearest other production. Arbuckle lime, drilled to

AT ELK CITY.—One of Big Chief Drilling Co.'s crews in this active field in Beckham and Washita counties, western Oklahoma. Left to right: A. H. Traugott (driller), J. E. Jackson, G. H. Charles, Edwin F. Goad, H. A. Traugott and Jack Pichford. Currently, the rig on which this crew is working is on contract to Shell Oil Co. Big Chief, with headquarters in Oklahoma City, is one of the more active contracting companies in the field.

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a total depth of 3,374 ft., is being tested first. Promising oil showings also were encountered in the shallower Lansing-Kansas City section. Quaker also has just contracted to drill another well for the same operator in the Southwest Cheyenne View area, same county. It will be 1 Schartz, NE NE NW 15-19-12.

Montgomery Drilling Co., El Dorado, Ark., is drilling for Murphy Corp. in the Bryceland field, Bienville Parish, North Louisiana. Latest test is 1 Barringer, NE SE SW 17-17n-15w.

American-Liberty Oil Co., Dallas, has turned contractor in using one of its rigs to drill a deep wildcat test for David M. Lide in Tensas Parish, eastern Louisiana. The test, 1 Outlaw, is in 46-13n-12e, 2½ miles northeast of Newellton. Contract is for 9,000 ft.

Corbett-Barbour Drilling Co., Tulsa, is starting a 5,700-ft. test for Flynn Oil Co. in the Southwest Meeker area, Lincoln County, Oklahoma. The location, on the Hull land in 35-12n-3e, is ¾ mile northwest of a lone oil well, producing from a sand at 4,932-47 ft.

Gabbert & Jones Drilling Co., Great Bend, Kans., has the contract for a wildcat test which M. B. Armer and associates are starting in southwestern Ellis County, Kansas. The test, 1 Smith, in the SE SE SW 6-15-19, is about 4 miles west of the new San Antonino townsite pool, nearest production.

Trigg Drilling Co., Oklahoma City, is starting another well for its own account in the Marshall area, Logan County, Oklahoma. The new test, 3 Sebranck, NE SE NW 30-19n-4w, is projected to 6,000 ft.

Harvey Drilling Co., Wichita Falls, Tex., is starting a 6,500-ft. wildcat test (1 Baer) for its own account in the extreme southern part of Greer County, Oklahoma. The location, in 2-3n-23w, is 11 miles southwest of Mangum.

J. J. Cody, San Antonio, has the contract for an 8,000-ft. test to be drilled 7½ miles west of the Fullerton field, Andrews County, West Texas. The test is Garrett M. Smith 1 McWhorter, SW NW 8, Block A-29, PSL Survey.

Coats & Hearrell Drilling Co., Longview, Tex., has moved its rig from its recently completed oil discovery well, 1 Chamness, in the Allen Samuel Survey, 14 miles east of Talco, Titus County, East Texas, to a location 672 ft. to the northwest, where it is starting a second well. The discovery well was completed as a 63-bbl. pumper from a sand at 4,571-75 ft.

W. H. Sherin & Sons, Oklahoma City, will drill for Peppers Refining Co. at a wildcat location 2 miles east of production in the Britton area, north of Oklahoma City, in Oklahoma County. Location of the test, 1 Maher, is in the NW NW NW 15-13n-3w.

Johnson & Flesher Drilling Co., Oklahoma City, has moved a rig to a location ¾ mile east of the recently opened Northwest Tyron pool, Lincoln County, Oklahoma, where it now is drilling for Dan Dunlap and A. Siberman. The test, 1 Abraham, NW NW NW 11-16n-3e, is projected to the Red Fork sand, productive zone of the new pool's discovery well.

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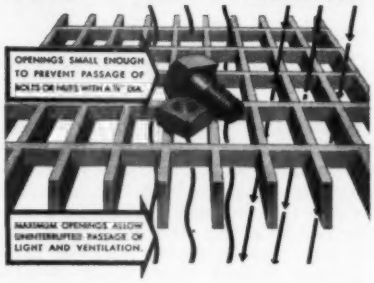
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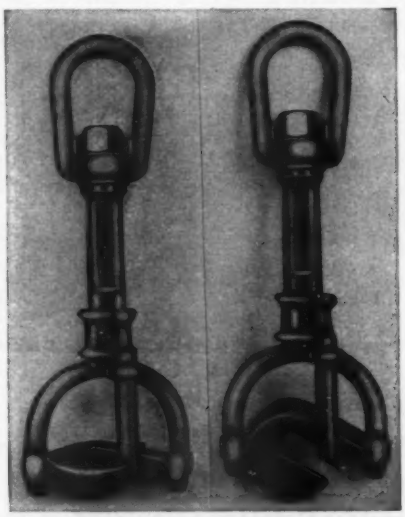

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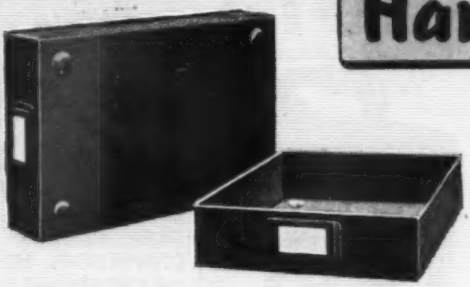

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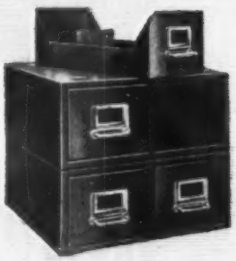

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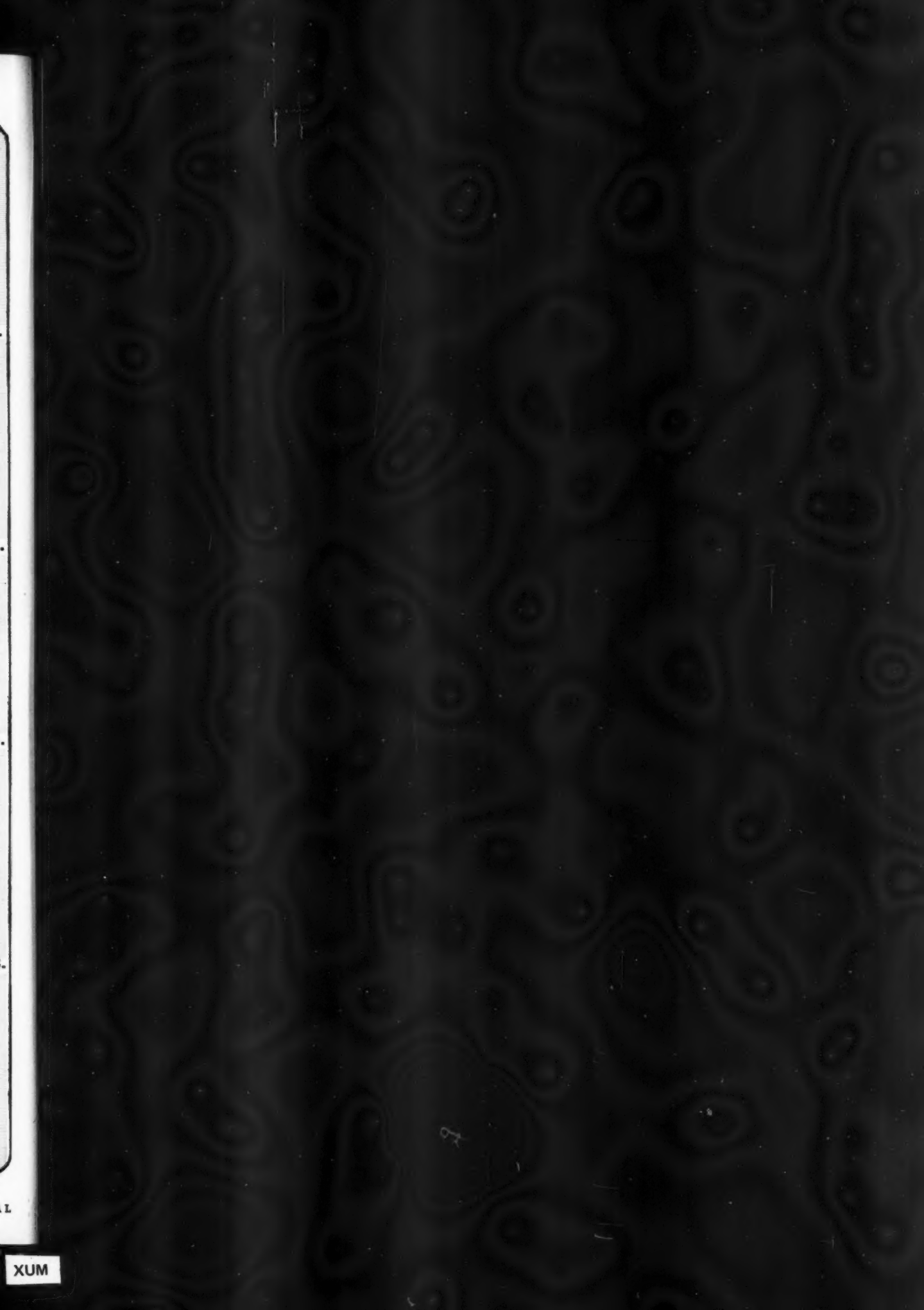

NATURAL GAS

Storage Facilities O.K.'d

WASHINGTON.—The Federal Power Commission has authorized East Ohio Gas Co., Cleveland, to construct and operate underground natural-gas-storage facilities in northeastern Ohio which are expected to help meet the increasing demands now being made upon the firm's system.

The construction program includes two 8⅝-in. lines totaling 12.3 miles in length; a 940-hp. compressor station, and an underground gas-storage pool consisting of 13 wells and 3,500 acres of gas-storage leaseholds in Columbiana County, Ohio. Estimated cost of the project is $622,700.

The company plans to operate the pipe lines solely for the purpose of storing gas in the underground-storage pool during off-peak periods and for transporting the gas into its general system during periods of peak demand. The storage facilities are estimated to have an ultimate capacity of approximately 2,400,000,000 cu. ft. with an approximate daily delivery capacity of 33,000,000 cu. ft. No new or additional service will be rendered through the facilities, East Ohio said.

Gas Companies Consolidate

WASHINGTON. — Consolidation of five gas companies located in Oil City, Pa., has been approved by the Securities and Exchange Commission.

Merger of the firms will be to simplify the holding-company system of National Fuel Gas Co., New York City, and to trim its operating expenses.

Firms which will be merged are: United Natural Fuel Gas Co., Ridgeway Natural Gas Co., St. Mary's Natural Gas Co., Smethport Natural Gas Co., and Mercer County Gas Co. The resulting firm will be known as United Gas Co.

United Fuel Proposal

WASHINGTON.—United Fuel Gas Co., Charleston, W. Va., has asked the Federal Power Commission for authority to construct 5.5 miles of pipe line and three compressor stations with a total horsepower of 6,460, to be used for delivering natural gas to storage pools in West Virginia.

The company would build about 3.5 miles of line extending from its Kanawha compressor station near Nitro, W. Va., to an existing line serving United's storage pool. A 2-mile line would connect with Tennessee Gas Transmission Co.'s line near Hunt, W. Va., and extend northerly to United's Hunt compressor station. This line would be used to transport gas received from Tennessee Gas for injecting into another storage pool which United plans to activate starting in the summer of 1950.

Estimated total capital cost of the proposed facilities is $2,464,800. United said the proposed facilities would be used in conjunction with its present facilities to provide additional volumes of natural gas for its present markets.

Hearings to Resume

WASHINGTON.—The Federal Power Commission has scheduled hearings to resume July 24 here in the consolidated proceedings involving several applications which include plans for natural-gas service in the New England area. Hearings were recessed in Boston May 29.

Included in the proceedings is an application by Northeastern Gas Transmission Co., which is proposing to build a natural-gas pipe-line system in New England. Other applications are those of Tennessee Gas Transmission Co. and Transcontinental Gas Pipe Line Corp., which would supply Northeastern's natural-gas requirements; and New York State Natural Gas Corp. and Niagara Mohawk Power Corp., which would build pipe-line facilities in New York State. Tennessee Gas would supply gas to New York State Natural for resale to Niagara Mohawk.

Texas Gas Asks Additions

WASHINGTON.—Texas Gas Transmission Corp., Owensboro, Ky., has asked the Federal Power Commission for authorization of construction and operation of five new sales-meter stations on its pipe-line system, in order to make natural gas available for distribution to five cities in Arkansas and Kentucky.

Texas Gas would utilize the facilities to sell gas to the following companies for resale and distribution in the respective cities and their environs: Arkansas Power & Light Co., Parkdale, Ark.; City of Marion, Ky.; Hardinsburg Gas & Electric Co., Hardinsburg, Ky.; Louisville Gas & Electric Co., LaGrange, Ky.; and the city of Carrollton, Ky.

Canadian Gas Plan

CHATHAM, Ont. — A proposal to supply natural gas to various communities in western Ontario not at present served was discussed recently with public-utilities representatives from Waterloo, Wellington, and Perth counties, by Thomas Weir, general manager, and W. L. Dutton, operations manager, of Union Gas Co. of Canada, Ltd.

The plan includes the laying of a 140-mile pipe line from the storage area in Dawn Township along a route passing near London, St. Mary's Stratford, Waterloo, and Kitchener, to a terminal point at Hamilton. A branch line to Guelph is also contemplated.

The plan is conditional on approval of tentative arrangements for importing increased quantities of Texas gas from the Panhandle-Eastern Pipe Line Co.

Seek to Build Gas Lines

WASHINGTON.—New York State Natural Gas Corp. and East Ohio Gas Co. have asked the Federal Power Commission for authority to construct connecting pipe lines in Pennsylvania and Ohio which would make additional natural gas available to East Ohio during the winter months.

New York State Natural plans to build a 20-in. line, 63 miles long, extending from Westmoreland County, Pennsylvania, to a point on the Pennsylvania-Ohio state line where it would connect with a 1-mile, 20-in. line to be built by East Ohio in the Petersburg, Ohio, area.

New York State Natural estimates that it will have available for sale to East Ohio approximately 40,000,000 cu. ft. of gas per day during the winter months of January, February, and March, with peak-day deliveries going as high as 87,000,000 cu. ft. The aggregate winter delivery for each year will be approximately 3,600,000,000 cu. ft., New York State Natural said.

Estimated cost of the construction is $3,792,806 for New York State Natural and $40,940 for East Ohio. The two companies are affiliates in the Consolidated Natural Gas Co. system.

FPC meanwhile has postponed until July 31 a hearing on application of Grand River Gas Transmission Co., Lake Shore Pipe Line Co., and Erie Gas Service Corp., seeking to supply natural-gas service in northeastern Ohio.

Natural Gasoline

L.P.G. Meeting Set

CHICAGO.—A joint meeting of the northeastern and southeastern districts of the Liquefied Petroleum Gas Association will be held in Atlantic City, October 5, F. W. Frost, Union Carbide & Carbon Corp., chairman of the program committee, announced. Sessions will be held at the Ambassador Hotel.

Developments in connection with L.P.G. weights and measures, the organization's promotional program, and distribution costs, will be discussed at the meeting.

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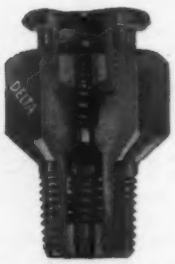

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REFINING

Cosden's Output Rises

BIG SPRING, Tex.—Cosden Petroleum Corp. reported last week that it had processed a total of 5,570,747 bbl. of crude oil for the fiscal year 1949, ending April 30. This is an increase of 2.7 per cent from the 1948 fiscal year.

The company reported a drop in crude-oil production, however.

Cosden reduced its yield of residual fuel oil during the year, and in so doing, began producing and marketing asphalt. The company will process approximately 6,000,000 bbl. of crude oil at its refinery here this year.

The plant has a crude-oil charge capacity of 18,000 bbl. daily, including 8,000 bbl. thermal cracking capacity and 8,000 bbl. catalytic cracking capacity.

Taylor Absorbs Coastal

TAYLOR, Tex. — Taylor Refining Co., sole stockholder of Coastal Refineries, Inc., has acquired all assets and assumed all liabilities of Coastal, the company announced here last week. The acquisition was effective June 30.

Included are all oil and gas-producing properties of Coastal, and the company's refinery at Port Isabel, Tex. The plant has a crude-oil charge capacity of 6,000 bbl. daily.

A cycling plant near McAllen, Tex., will be operated by Taylor Refining, and will be known as the Taylor-Mayfair cycling plant. No change in management or operating personnel will be made as a result of the corporate change.

Taylor Refining is a subsidiary of Petroleum Heat & Power Co., New York. Property owned jointly by Taylor and Mayfair Minerals, Inc., will be administered by Taylor-Mayfair Properties. Mayfair Minerals is the firm which developed gas-distillate production in the McAllen field of Texas, and until the acquisition, operated the cycling plant in that field jointly with Coastal.

Trunkline Gas Supply Co., which has Federal Power Commission approval to construct a natural-gas pipe line from Texas to Illinois, has contracted to purchase a minimum of 75,000,000 cu. ft. of dry gas daily from the McAllen field cycling plant beginning October 27, 1951.

More Fuel Contracts Let

WASHINGTON.—The Navy Department last week announced the letting of further contracts for petroleum products aggregating nearly $4,000,000.

Largest contracts went to Pontiac Refining Corp., Corpus Christi, for 270,000 bbl. of gasoline at $1,355,130, and Esso Export Corp., New York, for 260,000 bbl. at $1,173,900. A third con-

MOBILE PETROLEUM LABORATORY.—Dewey McDonald, Douglas Phillips, and Paul Howe, of The Texas Co.'s Beacon, N. Y., laboratories, are shown working in a Quartermaster mobile petroleum laboratory. The laboratory, air-conditioned and transportable by air, is one of five now in use by the U. S. Army, and has complete equipment for testing fuels and lubricants in the field. The units are underwritten by Texaco as part of American Petroleum Institute's Army affiliation program, in which oil companies sponsor reserve organizations so that trained petroleum groups will be available for the Army in case of emergency.

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tract, for 70,000 bbl., went to Taylor Refining Co., Taylor, Tex., at $364,560.

Other contracts announced went to Tide Water Associated Oil Co., San Francisco, for 220,000 bbl. of diesel fuel oil at $710,600; Sun Oil Co., Philadelphia, for 276,000 gal. of aviation fuel at $329,130, and Sinclair Refining Co., New York, for 510,000 gal. of aviation fuel at $93,279.

Aviation-Gas Output Down

WASHINGTON.—Production of aviation gasoline totaled 12,199,000 bbl. the first 4 months of 1950, a decrease of 3,414,000 bbl., or 21.9 per cent from the same period a year ago, the U. S. Bureau of Mines reported recently.

At the same time, demands for the fuel totaled 10,797,000 bbl., which represents a 21.8 per cent decline, or 3,025,000 bbl. compared to the same 1949 period. Domestic demand totaled 9,204,000 bbl., a decline of 1,248,000 bbl., or 11.9 per cent, and exports totaled 1,593,000 bbl., a decrease of 1,777,000 bbl., or 52.7 per cent from the same period last year.

Demand in April totaled 3,083,000 bbl., including 385,000 bbl. export and 2,698,000 bbl. for domestic use. This is a decrease of 12.6 per cent or 423,000 bbl. as compared with the same period in 1949. March demand amounted to 3,120,000 bbl.

Tax Collections Drop

WASHINGTON. — Treasury collections from taxes on gasoline, lubricating oils, and pipe-line transportation in May ran slightly more than $1,000,000 below those of the corresponding month in 1949, it was reported last week by the Internal Revenue Bureau. For the first 11 months of the fiscal year which ends July 31 receipts were only $24,000,000 higher than a year ago.

The bureau reported that May collections included $45,336,535 from gasoline against $47,003,908 last year; $6,252,005 from lubricating oils against $7,523,763, and $1,533,953 from pipeline transportation against $1,595,841.

For the 11-month period, gasoline taxes were $480,301,933 against $455,492,712 last year, and was the only one of the three levies to show an increase. Lubricating-oil revenue was $66,617,988 against $71,236,348, and pipe-line transportation returned $17,460,920 against $17,494,016, bureau records show.

W.P.R.A. Plans Announced

TULSA.—Western Petroleum Refiners Association will hold its 1951 annual meeting in San Antonio, John C. Day, executive secretary, announced.

The 3-day session will begin April 2, with headquarters at the Plaza Hotel, Day said.

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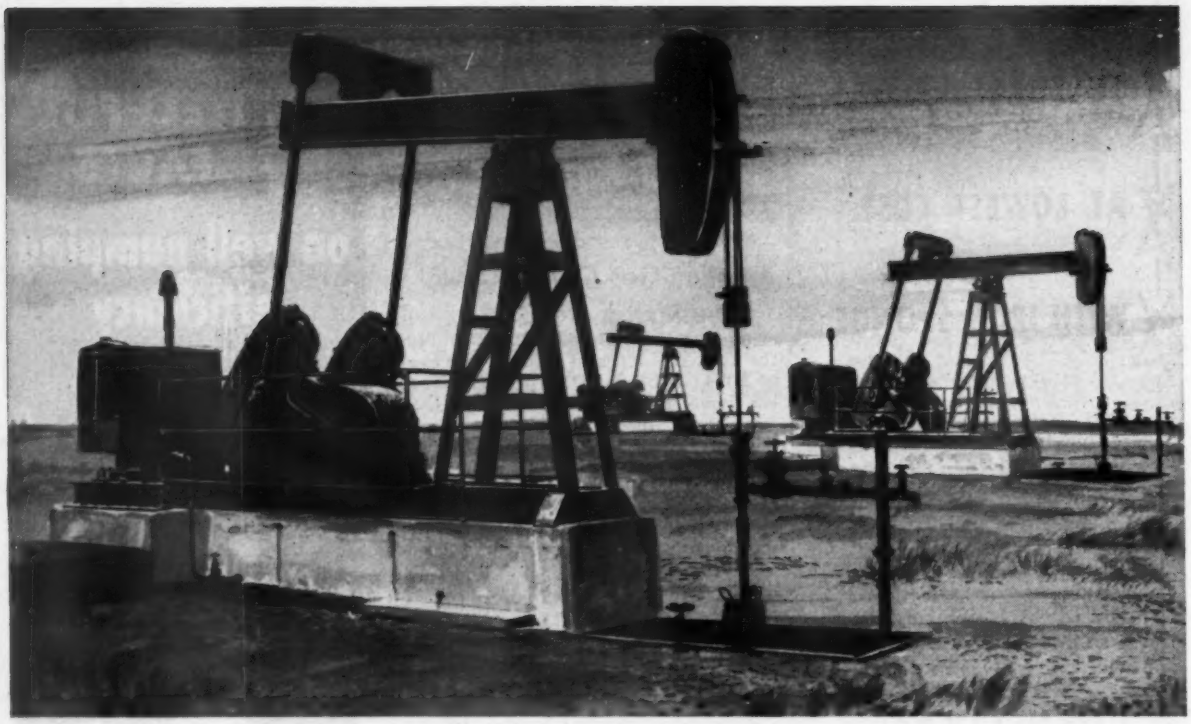

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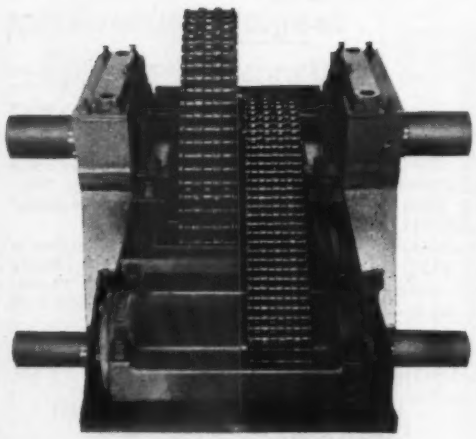

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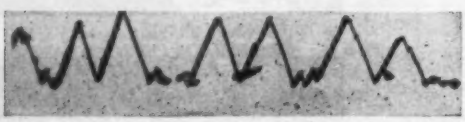

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Exploration and Drilling

Simpson Strike in North Texas

THE TEXAS CO. 1 J. B. Zetzsche, Block 41, Hill County School Lands Survey, 5 miles west of Richardon Caddo field in southwestern Montague County, Texas, appears to have opened a Simpson pool. This well is ready for completion tests from the Simpson limestone, which a series of drill-stem tests have proven to be oil bearing. The Simpson is a comparatively untapped formation in North Texas where Pennsylvanian production predominates. In Montague County, prior to the discovery of Viola production this year, nearly all production was from the Pennsylvanian. There was one three-well pool in the Simpson.

While the top of the Simpson has not been determined in 1 Zetzsche, or at least not disclosed, on the basis of drill-stem tests starting at 5,981 ft., the well has a possible pay section extending over an interval in excess of 500 ft.

On the first test, from 5,981-6,006 ft., gas came to the surface in 26 minutes and recovery was 300 ft. of oil in 90 minutes. Bottom-hole pressure reached 2,200 psi. in 35 minutes. Operators then ran electrical surveys to 6,161 ft., bottom of the hole at the time.

The next test, identified as in the Simpson, from 6,467-90 ft., had gas in 4 minutes, mud in 16 minutes, and flowing oil in 22 minutes. A gage on the flow was not reported. Bottom-hole pressure registered 3,125 psi. in 30 minutes.

A core from 6,490-6,500 ft. recovered 1 ft. of hard lime. Another core was cut to 6,510 ft., but recovery was not reported. A 2-hour test from 6,485-6,500 ft. had gas in 49 minutes and recovered 60 ft. of oil, plus the same amount of oil-cut drilling mud.

A second test from 6,485-6,500 ft. had gas in 3 minutes and oil in 8 minutes. After cleaning into pits, the well was turned into a separator, where it gaged 26 bbl. of oil in 1 hour through 20/64-in. tubing choke. When the tool was closed, it continued to flow oil for 2 hours, making 60 bbl. of additional oil. Flowing pressure ranged around 3,000 psi.

The Texas Co.'s previous discovery, 4 miles northwest of Bowie, was 1 P. E. Boedecker, NW NW Section 2,852, TE&L Survey, which at the time of its completion, in May this year, was identified as a Viola limestone discovery.

Not too much is now known about the two discoveries. Elevations have not been reported but that of the Boedecker area has been estimated at 1,100 ft. The 1 Boedecker was drilled to 7,164 ft., then plugged back to 6,825 ft. and completed from 25 ft. of pay starting at 6,800 ft. On potential test it flowed 145.5 bbl. of 43.9°-gravity oil a day through ¼-in. choke, with gas-oil ratio of 1,375 cu. ft. Flowing pressures were 425 psi. on tubing and 875 psi. on casing.

History of the Boedecker well reveals a conglomerate section, probably lower Pennsylvanian, was logged at 6,121-32 ft. A 2-hour drill-stem test of the section recovered 105 ft. of gas-cut mud. Viola lime was reported logged at 6,797-6,810 ft., indicating oil saturation, but a drill-stem test from 6,798-6,810 ft. plugged at the end of 1 hour and recovery was 35 ft. of drilling mud.

The well was drilled ahead without further testing of that section and samples showed cherty limestone between 6,810-16 ft., but field reports carried no shows of oil. A test on the section had gas in 55 minutes and in 2 hours recovered 140 ft. of free oil, plus 10 ft. of oil-and-gas-cut mud. Flowing pressure was 125 psi. and bottom-hole pressure was 3,225 psi.

A 2-hour test from 6,816-66 ft. recovered drilling mud, and a 2-hour test at 7,054-70 ft. recovered 60 ft. of slightly oil-and-gas-cut mud. From 7,070-7,120 ft. the recovery was mud, and the last drill-stem test, from 7,122-64 ft. recovered 50 ft. of slightly oil-cut salty mud, and 270 ft. of salt water. Electrical surveys were run and casing set at 6,782 ft.

At this writing, The Texas Co. 1-B Boedecker, in Section 2,851, a west offset and semiwildcat, was drilling near 6,000 ft., with no markers reported.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

NORTH CENTRAL TEXAS.—A second major Bend conglomerate discovery for northeastern Stonewall County was in prospect at Roark, Hooker, and A. G. Hill 1 C. L. Williams, SW SW 6-C-AB&N Survey, 8 miles northeast of Aspermont. On a drill-stem test at 5,860-86 ft., gas showed in 8 minutes and oil in 18 minutes. There was no gage of oil but estimates ranged from 50-250 bbl. hourly, and it was said to have flowed with such force that it required 15 minutes to close the testing tool. Drill pipe unloaded all the way out and there was no formation water. It was also reported to have had a high gas-oil ratio. On elevation of 1,622 ft., it had top of the Strawn sand at 5,068 ft., and the Caddo section from 5,745-5,860 ft. Location is about 3 miles southwest of Norsworthy 1 Wiley (see wildcat completions this issue), conglomerate strike which flowed 152 bbl. of oil in 12 hours. The 1 Williams is believed to be on the same structure as the Norsworthy well, and about 100 ft. high to the discovery.

ROCKY MOUNTAIN AREA.—Three apparent discoveries were at various stages this week: Ginther-Warren-Ginther of Houston are completing the 1 Dorman in the Sidney area, Cheyenne County, Nebraska, after recovering 2,700 ft. of oil on 30-minute test; Trigood Oil Co. tested oil in the Dakota at its 1 Couch, northeastern Colorado venture; Far West Oil Co. and Hancock Oil Co.'s 1 State at South Glenrock, Wyoming, flowed oil on 14-minute test of the Muddy sand. In Wyoming, Continental Oil Co. completed a new discovery in the South Little Buck Creek area. The well, 18 E.L.C.U. "B," had a potential of 375 bbl. of oil daily.

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Oklahoma

McClain County Wildcat Shows for Oil Producer

TESTING is under way at Greenbriar Oil Co.'s prospective deep, two-zone discovery well in northeastern McClain County. The well is 1 Wentzell, NE NW NW 33-8n-3w, 7 miles east of Blanchard and 2 miles west of the developing Southwest Goldsby pool. The deeper and first zone being tested is the Joins sand in which 5-in. liner was perforated initially opposite a 5-ft. interval at 11,520-25 ft. From these perforations the well flowed 480 bbl. of 42°-gravity oil in 24 hours through ½-in. choke but was cutting about 2 per cent salt water at the end of the period. Perforations have been squeezed to shut off the water, preparatory to further tests.

Total depth of the hole is 11,593 ft. with top of the Joins section at 11,496 ft. Above the Joins section, the well also has good prospects of production in the Bromide sand, topped at 10,674 ft. In drill-stem tests of that formation, the well flowed at rates up to 50 bbl. of oil per hour. A string of 7-in. casing was run through this section to 10,849 ft. When hole was deepened to its present total depth, 5-in. liner was run to a point near bottom.

On the east side of the Southwest Goldsby pool, Danciger Oil & Refining Co. 1 Bryan Goldsby, SW NE SE 35-8n-3w, got a recovery of 4,800 ft. of oil and 540 ft. of gas-cut mud in a drill-stem test of the Joins sand at 10,158-168 ft. Tool was open 2 hours for the test. Formations in the pool run substantially higher than in the Greenbriar wildcat due to a fault believed to exist between the two areas. The Danciger well also has indicated production in the Tulip Creek, McLish and Oil Creek horizons.

Shell Oil Co. 1 Finston-Neustadt, NE NW SW 29-3s-3w, a deep wildcat located ¾ mile northeast of shallow production in the Healdton pool, Carter County, flowed 119 bbl. of oil with 47 bbl. of salt water and acid water in the first 10 hours after kicking off. Production is from casing perforations at 6,974-7,020 ft. and 7,052-94 ft. in a Hunton conglomerate and lime section. The section had been treated with 6,000 gal. of acid. The well kicked off after swabbing 110 bbl. of acid and load oil. Hole had been drilled to a total depth of 7,668 ft. and casing run to 7,660 ft. Following unsuccessful tests through perforations in various zones in the basal Hunton, hole was plugged back to 7,140 ft. for the present tests. The location is about a mile southwest of the same company's 1 Bristow, C SW SE 20-3s-3w, completed last September in a Pennsylvanian sand at 9,056-9,100 ft. as the discovery and so far only well of the Whiskey Creek pool.

OKLAHOMA SUCCESSFUL WILDCATS

Garvin County: Mid-Continent Petroleum Corp. 1 Hassen, C SE NE 34-4n-3w, elev. 1,041 ft., flowed 100 bbl. of 40°-gravity oil per day from first Gibson sand at 6,906-24 ft., TD 7,088 ft.; first Deese 6,556 ft., second Gibson 6,940 ft., Hartshorne 6,985 ft.

Grady County: Extension to Knox—Ohio Oil Co. 1 Harrison "A," NE SW NE 29-3n-5w, elev. 1,169 ft., pumped 8 bbl. of 30.6°-gravity oil per day from sand at 2,790-96 ft., TD 3,352 ft.; sand 2,015 ft., 2,048 ft., 2,570 ft., 2,602 ft., 2,786 ft. and 2,799 ft., Permian 2,813 ft.

Okfuskee County: Herndon Drilling Co. 1 Harjo, NE NE SE 27-12n-9e, elev. 845 ft., flowed 1,500,000 cu. ft. of gas per day from Cromwell at 3,251-56 ft., TD 3,275 ft.; lime 2,740 ft., Booch 2,880 ft., Gilcrease 3,078 ft., (gas production in Castle, E.).

Osage County: Discovery of Grayhorse, No. —Norbla Oil Co. 1 Osage, NE NW NW 15-24n-6e, elev. 960 ft., est., pumped 60 bbl. of 37°-gravity oil per day from sand at 2,705-15 ft., TD; Dewey 1,800 ft., Osage-Layton 1,875 ft., Hogshooter 1,920 ft., Layton 1,990 ft., Checkerboard 2,225 ft., Big lime 2,395 ft., Oswego 2,415 ft., lime 2,701 ft., Cherokee sand 2,705 ft.

Payne County: Johnson Oil Refining Co. 1 Shinn, SE SW SW 12-17n-5e, 1 mi. N Happy Valley, elev. 950 ft., 2,250,000 cu. ft. of gas per day from Bartlesville at 3,418-49 ft., TD; Big lime 2,893 ft., Oswego 2,936 ft., Prue 3,012 ft., Verdigris 3,081 ft., lime 3,239 ft., Inola 3,368 ft.

New pay in Garr, So.—Woods Drilling Co. 8 Burger, SE SW SE 17-19n-5e, elev. 1,019 ft., flowed 140 bbl. of oil per day from second Wilcox at 3,871-83 ft., TD 3,885 ft.; Checkerboard 2,734 ft., conglomerate 2,922 ft., Big lime 3,058 ft., Oswego 3,114 ft., lime 3,366 ft., Red Fork 3,400 ft., Mississippi lime 3,652 ft., Woodford 3,750 ft., Misener 3,782 ft., Viola 3,786 ft.

Pottawatomie County: Extension ⅝ mi. NE to Maud—Davon Oil Co. 1 Wells est., SW NE SW 5-8n-5e, elev. 927 ft., pumped 31 bbl. of 40°-gravity oil per day from Misener at 4,032-60 ft., TD 4,136 ft.; Avant 1,405 ft., Dewey 1,570 ft., Perry 1,620 ft., Hogshooter 1,985 ft., Layton 2,050 ft., Checkerboard 2,370 ft., conglomerate 2,580 ft., upper Wewoka 2,705 ft., middle Wewoka 2,810 ft., lower Wewoka 2,890 ft., Calvin 3,080 ft., coal 3,340 ft., Earlsboro 3,610 ft., lime 3,670 ft., basal Pennsylvanian - Mayes 3,790 ft., Woodford 3,900 ft., Misener 4,022 ft., Hunton 4,064 ft., Sylvan 4,126 ft.

OKLAHOMA WILDCAT FAILURES

Carter County, Sholem Alechem area: Seaboard Oil Co. 1 Johnson, NE SE NE 14-2s-3w, elev. 999 ft., dry, TD 5,025 ft., fusilinid 3,662 ft., Carpenter sand 4,068 ft., Tussy lime 4,258 ft., Deese 4,944 ft.

Garvin County: Continental Oil Co. 1 Butterly, C NW NW 22-1n-1e, elev. 856 ft., dry, TD 6,500 ft., Hoxbar 3,180 ft., Deese 5,780 ft., lower Pennsylvania limy conglomerate 6,225 ft., Viola 6,352 ft.

Lincoln County: McLean and Finston 1 Nelson, SW NE SE 21-13n-6e, 1 mi. S Laffoon, elev. 824 ft., dry, TD 4,345 ft., Checkerboard 2,080 ft., Oswego 2,894 ft., Prue 2,917 ft., Verdigris 3,045 ft., Skinner 3,060 ft., lime 3,260 ft., Inola 3,415 ft., lime 3,550 ft., Caney 3,733 ft., Woodford 4,040 ft., Hunton 4,067 ft., Sylvan 4,148 ft., Viola 4,231 ft., Wilcox 4,305 ft., second Wilcox 4,333 ft.

Gillespie & Sons 1 Keegan, SE NW NE 35-14n-3e, ⅝ mi. S of NW Midlothian, elev. 894 ft., dry, TD 4,304 ft., Hogshooter 3,010 ft., Layton 3,048 ft., Checkerboard 3,364 ft., conglomerate 3,383 ft., Oswego 4,031 ft., upper Prue 4,070 ft., lower Prue 4,107 ft., Skinner 4,293 ft.

Logan County: McLean and Lynn Drilling Co. 1 Clark, NW NW NW 15-16n-1w, 3 mi. SW of S Langston, elev. est. 1,138 ft., dry, TD 5,755 ft., Hogshooter 4,242 ft., Cleveland 4,525 ft., Oswego 4,960 ft., Prue 5,050 ft., Mississippian 5,245 ft., Woodford 5,275 ft., Hunton 5,326 ft., Sylvan 5,390 ft., Viola 5,481 ft., dense 5,536 ft., dolomite 5,575 ft., first Wilcox 5,661 ft., second Wilcox 5,742 ft.

McIntosh County: J. R. Wilson 1 Vinson, C SE NW 18-11n-17e, 1 mi. E gas production, dry, TD 3,005 ft., Wapanucka 2,096 ft., Cromwell 2,230 ft., Pitkin 2,298 ft., Hunton 2,875 ft., Viola 2,938 ft., Wilcox 2,997 ft.

Oklahoma County: K. A. Rogers et al 1 Wyman, C SW SW 8-12n-1w, 1 mi. E Munger, elev. 1,252 ft., dry, TD 6,285 ft., Hogshooter 4,980 ft., Checkerboard 5,300 ft., conglomerate 5,460 ft., Oswego 5,823 ft., lime 6,160 ft., detrital sand 6,190 ft., Hunton 6,215 ft.

Payne County: R. C. Jones Co. et al 1 Gaunt, SE SE NE 15-18n-5e, 1¼ mi. SW Norfolk, elev. 889 ft., dry, TD 3,294 ft., Checkerboard 2,498 ft., conglomerate 2,512 ft., Big lime 2,919 ft., Oswego 2,942 ft., Verdigris 3,102 ft., Skinner 3,200 ft., lime 3,244 ft., Prue 3,030 ft., Red Fork 3,284 ft.

W. O. Allen 1 U. S. A., SW SW NE 29-19n-1e, elev. 1,092 ft., dry, TD 5,201 ft., Layton sand 3,620 ft., Big lime 4,280 ft., Oswego 4,410 ft., lime 4,640 ft., Red Fork 4,668 ft., Mississippi lime 4,787 ft., Woodford 4,925 ft., Misener 4,954 ft., Sylvan 4,975 ft., Viola 5,057 ft., Wilcox 5,142 ft., second Wilcox 5,792 ft.

Tillman County: Farris Oil Co. 1 Blankenship, SW SW SW 2-3s-16w, dry, TD 3,416 ft., Canyon 3,362 ft.

California

Three Cuyama Valley Tests Are Closely Watched

LOS ANGELES. — Three wildcats under way in the southeastern end of Cuyama Valley are being watched more and more closely as they approach critical depths.

About 2 miles south of South Cuyama field, and apparently south of the Nacimiento fault, Rothschild Oil Co. at last report was drilling below 4,300 ft. at its 1 U. S. in Section 11-9n-27w. This venture is the first drilled directly south of Cuyama production, and in an area where there is still much to be learned about structural displacement.

In addition to Rothschild's holdings, other companies having leases in this area include Western Gulf Oil Co., Universal Consolidated Oil Co., Richfield Oil Corp., Wilshire Oil Co., and Honolulu Oil Corp. Acreage held is composed entirely of U. S. Government leases.

East of South Cuyama about 5 miles, Mohawk Petroleum Corp. and Humble Oil & Refining Co. were below 8,800 ft. at their 48-2 Lungstrom in Section 2-9n-26w. At that depth in Dibblee zone, oil productive at around 3,200 ft. in South Cuyama, had not yet been picked up. The zone is anticipated in the next 200 to 700 ft.

To the northeast of this test about 8 miles, in Section 18-10n-25w, and near the Kern-San Luis Obispo county line, Richfield Oil Corp. was below 4,100 ft. at its 1 Caliente Unit. This test falls 2 and 3 miles northwest of two dry holes drilled earlier this year by The Texas Co. and Independent Exploration Co. on the Stubblefield ranch.

In northwestern Cuyama the most closely watched wildcat was Hancock Oil Co. 33-31 Hancock-Bishop in Section 21-32s-20e, or almost 3 miles northwest of the new Morales field. According to reports hole has been carried to 5,000 ft. After obtaining an electrical log and sidewall samples the operator was preparing to core ahead.

In the coastal district, a 1-mile eastern extension to Ventura Avenue's D-7 zone was completed for a 500 - bbl. per day producer. The extensioner was Lloyd Corp., Inc., 1 Sexton in Section 19-3n-22w, with production being obtained through perforations at 12,606-13,448 ft. Its completion had been delayed by water intruding into the hole below the casing point.

Among the wildcats staked was a 1-mile southeast outpost to Guijarral Hills field in Fresno County. The wildcat, Universal Consolidated Oil Co. 43-12 Orr, will be drilled in Section 12-21s-6e. The test also falls about 1½ miles northwest of Kettleman North Dome field. Also in Fresno County, Shell Oil Co. has staked location for a wildcat in the Cantua area. Site is in Section 24-15s-14e.

Also announced was a new test for the Imperial Valley, southwest of the Salton Sea. The wildcat, staked in SW SW Section 10-11s-10e, will be drilled by Rasmussen & Mortimer as their 1 Truckhaven.

CALIFORNIA SUCCESSFUL WILDCAT

Kern County, Belgian Anticline (McKittrick area): Pacific Western Oil Corp. and Tide Water Associated Oil Co. 82A-31 Rankin, 31-30s-22e, on 6-hr. gage flowed at rate of 3,500 bbl. daily through ½-in. choke, 35.8°-gravity crude, oil sand 5,400 ft., TD 5,495 ft., ½-mile south extension or new pool

discovery, tentatively being called Telegraph Hill, elev. 1,552 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Caliente Creek area: Groshen Oil Co. 1 Groshen, 22-30s-30e, dry, TD 3,542 ft., elev. 1,375 ft.

Tejon Hills area: Bear Mountian Oil Co. 1 Bear Mountain, 12-11n-18w, dry, TD 1,191 ft., elev. 1,303 ft.

Barney Cornett et al., 1 C & A Tejon, 13-11n-18w, dry, TD 429 ft., elev. 1,100 ft.

J. F. Kosanke 6 Kosanke, 14-11n-18w, dry, TD 700 ft., elev. unknown.

Monterey County, Monroe Swell area. Texas Co. 2 Beedy-NCT, 19-19s-7e, dry, TD 3,648 ft., elev. 1,226 ft.

Los Angeles County, Mint Canyon area: Carl Riddell 1 Wright-Kovaleski, 17-5n-14w, dry, TD 751 ft., elev. 2,380 ft.

Orange County, Meadow Lark area: Shell Oil Co. 55-23 Anaheim Sugar, 23-5s-11w, dry, TD 8,891 ft., elev. 27 ft.

San Luis Obispo County, Cholame area: C. W. Colgrove 16-2 Jack, 2-25s-15e, dry, TD 4,71 0ft., elev. 1,169 ft.

San Mateo County, La Honda area: Jergins Oil Co. 1 Y.M.C.A., 26-7s-4w, dry, TD 2,510 ft., elev. 1,075 ft.

Santa Barbara County, Russell Ranch area: Richfield Oil Corp. 35-36 Anderson, 36-11n-28w, dry, TD 1,153 ft., elev. 2,027 ft.

Ventura County, Ventura Avenue area: Samuel Bennett 1 Bennett-Foster, 28-3n-23w, dry, TD 12,662 ft., elev. 110 ft.

Louisiana-Arkansas

Claiborne Test Believed In Cotton Valley

SHREVEPORT. — Continental Oil Co. 1 P. C. Wideman, 7,000-ft. wildcat in the NW SE 21-21n-7w, Claiborne Parish, was coring ahead at 5,921 ft. and believed to be in the Cotton Valley formation. Tentative top on the formation, from cores, was around 5,870 ft., on elevation of 299 ft.

First drill-stem test reported, from 5,808-28 ft., recovered 390 ft. of salty gas-cut mud in 5 minutes. A second test from 5,858-77 ft., open 15 minutes, recovered 30 ft. of gas-cut mud and no salt water. Operators cored from 5,880-5,909 ft., recovering 2 ft. of tight limestone, 4 ft. of shale, 5 ft. of limestone with a light gas odor, and 15 ft. of shale and lime.

Three miles southeast of Colquitt, Stanolind Oil & Gas Co. 1 Meadors, 8-22n-5w, was drilling ahead at 8,393 ft., in the Cotton Valley. A core from 7,810-47 ft. returned 32 ft. of shale and siltstone with no shows, 2 ft. of sand with slight fluorescence, and 3 ft. of Bodcaw shale.

C. N. Valerius 1 Crossett Lumber Co., Smackover wildcat in 21-23n-7e, Morehouse Parish, had top of that formation at 5,432 ft., on elevation of 155 ft., and was coring ahead at 5,461 ft.

Caddo Oil Co. 1 Harrison Miller, SW NE 19-10n-10e, Tensas Parish wildcat 3 miles north of Lake St. John field, was dry at 6,306 ft., in the Wilcox topped at 3,284 ft. Operators took 45 sidewall cores in the Wilcox, with no results.

In Union Parish, T. L. James & Co. 1 Burden, 36-23n-2w, cored from 8,545-57 ft., in the Cotton Valley. Recovery was 1½ ft. of tight sand with slight show of oil and 10n ft. of sandy shale with no shows. Drilling continued below 8,640 ft.

NORTH LOUISIANA WILDCAT FAILURES

Bossier Parish: Wadley & Forgotson 1 Bellevue Lumber Co., 27-20n-11w, dry, TD 2,783 ft., elev. 244 ft., Midway 710 ft., Nacatoch sand 1,237 ft., Tokio 2,102 ft., Paluxy 2,764 ft.

Red River Parish: G. M. LeGrand 1 J. F. Yearwood, NW NW SE 7-14n-11w, dry, TD 996 ft.

Union Parish: Southwest Gas Producing Co. 1 J. F. Weldon, approximately SE NE 24-21n-3w, dry, TD 9,087 ft.

ARKANSAS WILDCAT FAILURES

Hempstead County: J. H. Buchanan 1 Andy

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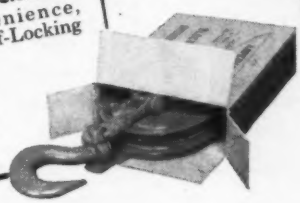

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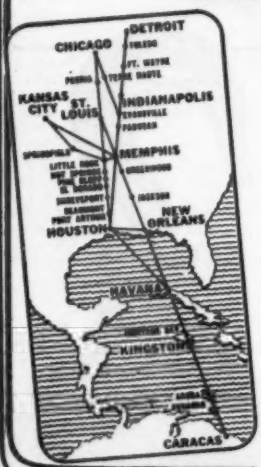

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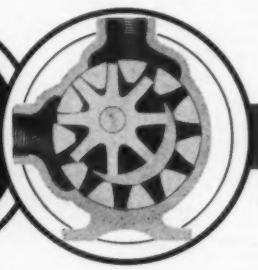

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Union County: Hollyfield & McFarlane 1 fee, SW SW 28-18s-15w, dry, TD 7,704 ft., elev. 193 ft., Cotton Valley 5,270 ft., Jones sand 7,552 ft., Smackover 7,688 ft., porosity 7,694 ft., DST 7,699-7,704 ft., recovered salt water.

Southwest Texas

New Sand Opener Flows 9 Bbl. Daily

CORPUS CHRISTI.—Potential test has been run on Armstrong & Sutton 1 R. Jackson, Block 1, Orange Grove Subdivision, John Pollan League, new sand opener in West Sinton-Shallow field, San Patricio County. The well was completed in April this year, but test was not made until recently. The well flowed 9 bbl. of 21°-gravity oil daily through perforations at 1,874-84 ft. Tubing pressure was 285 psi., and total depth of the well is 2,433 ft.

George W. Graham ran a drill-stem test from 9,036-61 ft. in the B-1 F. G. Gabriel, a test in W. E. Whitten (Mud Flats) field of Aransas County, and recovered condensate. Through a ¼-in. choke, recovery was 350 ft. of condensate and 1,000 ft. of water cushion. Surface pressure was 2,000 psi. and it built up to 2,900 psi. after being shut in. Operators are preparing to core this test, which apparently is a new pay for the field, ahead at 9,075 ft.

Hugh Kirkpatrick et al have completed the 1 Eduviges Alvarez for a new gas-field discovery approximately 1½ miles north of San Yzidro in Starr County. The test was drilled to a depth of 6,033 ft. and 5½-in. pipe set at 4,665 ft. for the completion. Operators perforated from 4,590-4,625 ft. and completed the well for a gas producer and have now shut the well in. The well is located in the Santa Teresa Grant.

In Duval County, Sid Katz 3 W. R. Peters, wildcat test in GB&CNG Survey 37, 13 miles south-southwest of Freer, cored some soft clean sand with faint odor at 3,203-13 ft. Drill-stem test was run at that level, using ¼-in. and ⅜-in. chokes. The well showed 550 psi. pressure in 3 minutes. Details of the recovery are not available.

The 55 new locations include 18 wildcat starts, 1 each in Caldwell, Frio, Williamson, Zavala, Cameron, Hidalgo, San Patricio, Starr, and Webb counties, 2 each in Jim Hogg and Nueces counties, and 5 in Duval County. There was 1 successful exploratory test completed in San Patricio, while 16 were dry, 1 each in Caldwell, La-Salle, Milam, Duval, Hidalgo, San Patricio, and Starr counties, 2 each in Atascosa, Jim Hogg, and Jim Wells counties, and 3 in Webb County.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCAT

San Patricio County: New pay at West Sinton-Shallow — Armstrong & Sutton 1 Roy Jackson et al, Lot 8, Orange Grove Subd., John Pollan Lge., top pay 1,874 ft., TD 2,480 ft., perf. 1,874-85 ft., IP: 8 bbl. oil per day, ⅜-in. choke, TP 285 psi., 21° grav.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCAT

Atascosa County: Bruce L. Hoover 1 George W. Thompson, Rusk Transportation Sur. 1, A-755, dry, TD 2,474 ft.

James Simmons et al 1 E. C. Tuerpe, R. C. Rogers Sur. 517, 3 mi. S of Somerset field, dry, TD 2,112 ft.

Caldwell County: C. C. Coupland 1 W. L. Ray, M. G. Dyles Sur., 2 mi. N-NE of Lockhart, dry, TD 1,830 ft.

Duval County: Bridwell Oil Co. 2 Rosa V. de Benavides, Cole Petroleum Co. Subd., M. Arispe Gr., 4 mi. E of Bruni, dry, TD 2,010 ft.

Hidalgo County: A. J. Hammer 1 Max Lutz,

Lot 2, Hidalgo County School Land, 20 mi. NW of Mission, dry, TD 7,208 ft.

Jim Hogg County: Daubert-Achning 1 Silver Ranch, El Sordo Gr., Luis Vela, 10 mi. SW of Bebbronville, dry, TD 4,040 ft.

Jake L. Hamon & Edwin L. Cox 1 Gruy Est., Sec. 11 Noriacitas Gr., 3 mi. W of Hebbronville, dry, TD 3,919 ft.

Jim Wells County: J. H. Carroll 1 N. O. Adams, Los Presenos Gr., A-281, just N of Magnolia City field, dry, TD 5,770 ft.

Ralph E. Fair, Inc., & Woodward & Co. 1 Canales, F. Canales Sur. 230, A-85, 10 mi. NW of Premont, dry, TD 5,625 ft.

LaSalle County: Henderson Coquat et al 1 H. D. Storey, I&GNRR Co., Sur. 21, 6 mi. E of Cotulla, dry, TD 7,041 ft.

Milam County: John W. Williams 1 J. D. Nelson, Jose Leal Gr., 7 mi. NE of Rockdale, dry, TD 1,450 ft.

San Patricio County: A. O. Morgan 1 Louise Newmann, Lot 9, J. W. Bullard Subd., Burgess Sur., 3 mi. NW of Odem, dry, TD 5,800 ft.

Starr County: Charles E. Long 1 Francisco Salinas, Porc. 109, 20 mi. NE of Roma, dry, TD 2,211 ft.

Webb County: J. B. Blanchard 1 J. E. Neal, T&NO Ry. Sur. 132, 3 mi. SW of Bruni, dry, TD 3,043 ft.

McCarrick Oil Co. 2 Albert Martin, Trustee, BS&F Sur. 693, Cert. 1, dry, TD 2,562 ft.

Ryan, Hays & Burke 1 La Mesa Land & Cattle Co., A. Grando Sur. 109, 15 mi. NW of Laredo, dry, TD 3,732 ft.

Eastern Texas

Woodbine Test Under Way In Cherokee County

DALLAS.—Carter-Jones Drilling Co., contractor, had drilling under way at Roosth & Genecov Production Co. 1 Whiteman-Docker, located 330 ft. from the most northerly south line and 3,118 ft. east of the most westerly west line of the J&GN Survey, A-420, 10 miles west of the Alto townsite in Cherokee County. Contract depth was 5,800 ft., which was expected to penetrate the Woodbine sand.

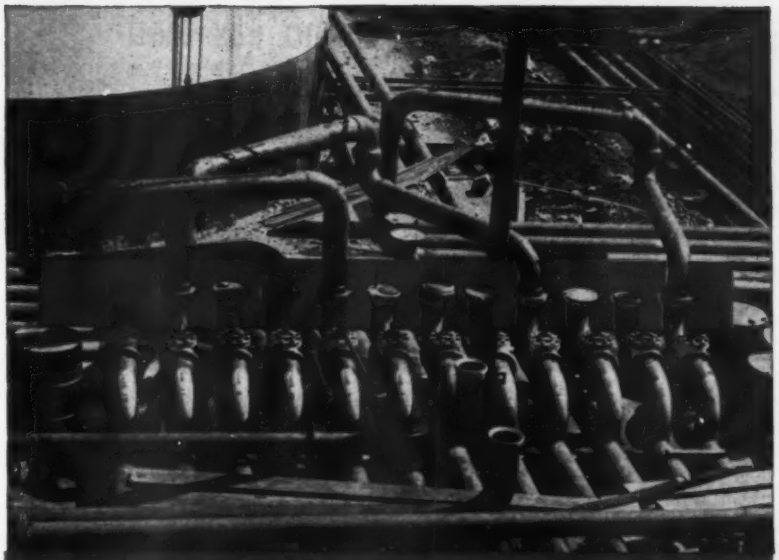
The new operation is a semiwildcat, being 1,500 ft. northeast of the one-well South Pine field, discovered by Geier-Jackson 1 South Pine Lumber Co., T. N. Jones Survey, which flowed 175 bbl. of oil a day, plus 50 bbl. of salt water, from the Woodbine. The 1 South Pine had the Woodbine at 5,264 ft., on elevation of 334 ft. Two dry holes were drilled in the area by the same operator.

Coats & Moore have staked location for the 2 Josephine Chamness, 8 miles east of Talco in Titus County. Location is on a 200-acre tract in the Allen Samuel Survey. The 4,600-ft. Paluxy test is an offset and confirmation well to the discovery which completed for 60 bbl. of oil a day from perforations at 4,571-78 ft.

In Kaufman County, T. D. Humphrey 1 N. E. Tharp, D. Cervantes Survey, was to complete from its present total depth of 3,648 ft. Seven-inch casing had been set on bottom and electrical surveys indicated good possibilities of production. The well was originally committed to 6,500 ft. as a Rodessa test, but operators were afraid of damaging the Woodbine sand at 3,610-18 ft. by drilling ahead. This section showed for commercial production on a drill-stem test. To fulfill the drilling obligation, a new hole, called the 2 Tharp, was to be drilled some 30 ft. east of the first, and carried to the Rodessa. Further tests in the Woodbine section of the 1 Tharp will be postponed until after the second well has been drilled to the Rodessa, according to reports.

EAST TEXAS (DISTRICTS 5, 6, AND 6-P) WILDCAT FAILURES

Anderson County: Bobby Manziel 1 M. A. Davey, Washington Lewis Sur., 16 mi.



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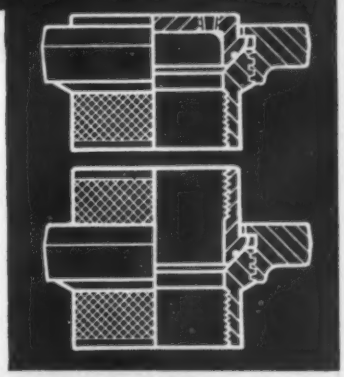

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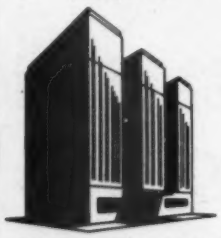

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E Elkhart, dry, TD 5,600 ft., elev. 320 ft., Woodbine 5,410 ft. by samples.

Red River County: O. C. Dickson 1 Mrs. Travis Atkinson, Robert Ragsdale Sur., 8 mi. N Kimichi, dry, TD 1,17 ft., completed as flowing water well.

Texas Gulf Coast

New Pay Opened In Swan Lake Field

HOUSTON.—New pay has been opened in Swan Lake field of Jackson County at Southern Minerals 4 G. T. Brooking, Josiah H. Bell Survey, Abstract 7. Depth of the new pay is not known; however, on 24-hour potential the well made 247 bbl. of 41.1°-gravity oil through a 5/32-in. choke. After potential was taken, the well flowed on 3/16-in. choke at the rate of 368 bbl. per day. Total depth of the well is 8,638 ft. and operators set 5½-in. casing to 7,445 ft.

Swan Lake field now has one dual gas well, one 6,000-ft. single oiler, and a single gasser. Sidewall samples indicate 150 ft. of effective pay below the 6,000-ft. zone, including two oil and three gas sands which were not tested.

G. S. Hammonds 1 Walter Schneider, Austin County wildcat in James Cummings Survey, Abstract 31, tested gas on a drill-stem test of perforations at 10,730-37 ft. The well flowed an estimated 1,400,000 cu. ft. of gas per day through a ¼-in. choke with 1,800-psi. working pressure. On previous test of upper sands, the well flowed 99 bbl. of oil on a 24-hour test, through perforations at 10,057-72 ft.

J. B. Ferguson and Peter N. Petkas have completed the 1 Mrnustik et al Unit, Wharton County wildcat, in B. B. Pearce Survey, Abstract 318, for a gas discovery. On open-flow potential, the well flowed 10,000,000 cu. ft. of gas per day through perforations in the Frio at 5,043-47 ft. Hole is bottomed at 5,344 ft. The new gasser is located 5 miles north of El Campo, and 3 miles northeast of Gobbler Creek field.

The 60 new locations include 23 wildcat starts, 1 each in Austin, Brazoria, Tyler, Waller, Goliad, Karnes, and Live Oak counties, 2 in Bee County, and 3 in Matagorda County. There were 3 successful exploratory tests completed, 1 each in Karnes, Victoria and Wharton counties, while 10 were dry, 1 each in Goliad, Jackson, Live Oak, Wilson, Fort Bend, Harris, Montgomery, and Orange counties, and 2 in Liberty Ccunty.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Karnes County: Oil discovery—Shell Oil Co. 1 Ben Korzekwa, Louis Manchaca Sur., 4 mi. SW of Falls City field, top pay 6,257 ft., TD 6,430 ft., perf. 6,257-64 ft., IP: 80 bbl. oil per day, on pump, 37° grav.

Victoria County: Gas discovery—E. C. Scurlock & M. S. Welder 1 Grace S. Henry et al, 4 League Grant to town of Victoria, ½ mi. S of Victoria field, TD 5,365 ft., perf. 3,822-28 ft., IP: 108,000,-00 cu. ft. of gas per day, open flow, SIP 1,512 psi.

Wharton County: Gas discovery—J. B. Ferguson & Peter N. Petkas, 1 Mrnustik et al Unit, B. B. Pearce Sur., A-318, 5 mi. N of El Campo, TD 5,344 ft., top pay 5,043 ft., perf. 5,043-47 ft., IP: 10,-000 cu. ft. of gas per day, open flow, SIP 1,700 psi.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Ft. Bend County: Trull & Thompson 1 J. M. Moore Est., Geo. Dedrich Sur., 5 mi. S SE Needville, dry, TD 5,150 ft.

Goliad County: H. R. Smith & Luling Oil & Gas Co. 2 W. F. Stuermer, James Brown Sur., A-64, 3 mi. SW of Weesatche, dry, TD 3,690 ft.

Harris County: Francis M. Blair, Jr. 1 John B. Charpiot, D. Harris Sur., A-26, 6½ mi. SE of Humble, dry, TD 9,065 ft.

Jackson County: Ryan, Hays & Burke 1 W. J. Barnes, H. W. Munson Sur., A-57, 4 mi. W of No. LaWard field, dry, TD 7,025 ft.

Liberty County: Randon Production Co. 1 W. C. Atkinson, Reason Green Sur., A-43, 6 mi. NE of Dayton townsite, dry, TD 9,011 ft.

The Texas Co. 1 J. D. Williams et al, H&TC Sur. 123, 7 mi. NW of Dayton, dry, TD 6,734 ft.

Live Oak County: The Chicago Corp. & Nueve Oil Co. 2 J. I. Hailey, P. Miller Sur., A-277, 6 mi. E-SE of Mikeska, dry, TD 6,011 ft.

Montgomery County: P. L. D. Well Service Co. 1 Thomas W. Vaughan, William Weir Sur., A-42, dry, TD 3,718 ft.

Orange County: Earl C. Hankamer et al 1 Powell Lumber Co., GC&SF Sur. 7, A-264, dry, TD 7,965 ft.

Wilson County: A. W. Phillips 1 Tom Guajardo, Juan de La Garza Grant, 11 mi. NW of Floresville, dry, TD 2,980 ft.

Michigan

Traverse Oil Show Is Logged in Mecosta

MOUNT PLEASANT.—Plug-back operations were being continued at Louis Rose 1 Lane, NW NW NW 26-14n-10w, Mecosta Township wildcat, Mecosta County, this week. Present plans call for acid treatment when the plug-back job is completed.

Rose's wildcat logged a Traverse oil show at 2,855-58 ft. Hole carried 300 ft. of free oil in 42 hours natural. A dirty hole hindered first attempted acid treatment and when cleanout operations were concluded, it was discovered that depth of hole had been moved from 2,860 to 2,863 ft. About 200 ft. of water was showing after this deepening operation. Hole had been plugged back with plastic to 2,860½ ft. at which point hole carried water and about 70 ft. of oil. Operators hope to successfully plug back to the original total depth, 2,860 ft., before acidizing.

The east side of Bard Dundee oil pool was commanding new interest this week as two recently completed wells were being flowed, through restricted chokes, at about 50 bbl. of oil a day.

W. L. McClanahan (Estate) and W. B. Stewart A-3 Dull, NW NE NE 6-17n-2w, flowed 120 bbl. of net oil in 5 hours after acid treatment in the Dundee, 3,936 ft., total depth. Production was being restricted. Well appeared to be the best yet completed in the pool.

Two 10-acre locations east of the A-3 Dull, Stewart & Holloway's 1 Lang-Schwartz et al, NW NW NW 5-17n-2w, was reported to be averaging about 60 bbl. a day, restricted flow, on initial tests after acidization with 1,000 gal. at 3,938 ft., total depth. It was expected that a new drilling campaign would be started in this field as a result of these two completions.

MICHIGAN WILDCAT FAILURES

Allegan County, Casco Township: P. F. Broughton 1 Lyman, SW NW NE 15-1n-16w, Traverse 1,169 ft., dry, TD 1,174 ft.

Hopkins Township: S. Scott Wigle 1 Wicks, NW NE SW 33-3n-12w, Traverse 1,758 ft., dry, TD 1,760 ft.

Salem Township: Harry Stroud 1 DeWitt, SW SW SE 30-4n-13w, Traverse 1,613 ft., dry, TD 1,628 ft.

Valley Township: Rex Oil & Gas Co. 1 Kingsley, NW SE NE 11-2n-14w, Traverse 1,475 ft., dry, TD 1,525 ft.

Arenac County, Clayton Township: George Brooks 1 Shepard, SE NW SW 33-20n-4e, Dundee 2,940 ft., dry, TD 3,094 ft.

Bay County, Pinconning Township: Don Rayburn A-1 Cooper-Lucht, SW SE NE 29-17n-4e, Dundee 2,860 ft., dry, TD 3,065 ft.

Muskegon County, Egelston Township: Avalon Oil Co. 1 Davis, NW NW SE 22-10n-15w, Dundee 2,205 ft., dry, TD 2,287 ft.

Newaygo County, Lilley Township: Mercer Oil Co., Inc. 2 Sippy, NE SE SE 23-16n-13w, Monroe 3,174 ft., dry, TD 3,245 ft.

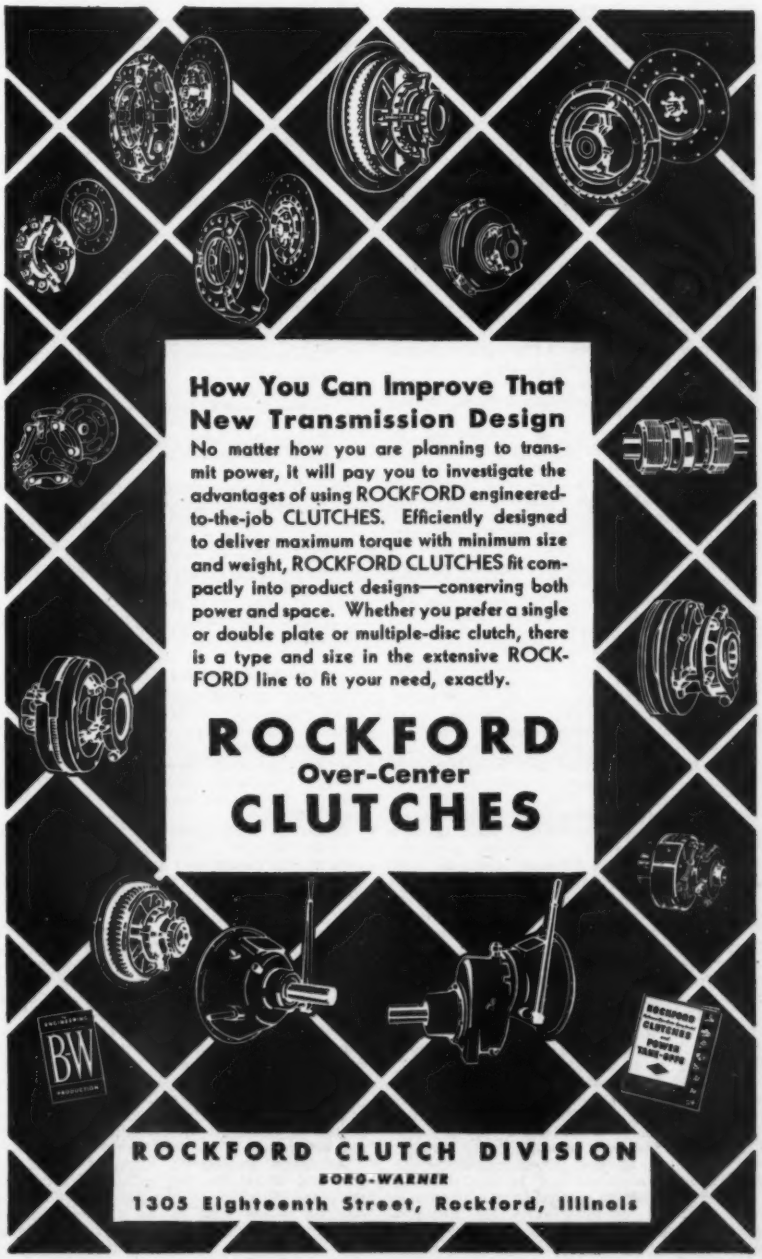
Mississippi

Sibley Gets Its Most Encouraging Test to Date

JACKSON.—In the new Sibley field of Adams County, Gulf Refining Co. 1 W. L. Ball, 20-5n-3w, is waiting on cement after setting 7-in. casing to 6,550 ft. The fourth oil sand was cored and drill-stem tested at 6,475-85 ft. Using ¼-in. top and bottom chokes, tool was left open 10 minutes, and recovery was 3,560 ft. of 42.9°-gravity oil. Bottom-hole flowing pressure was 2,575 psi., and shut-in bottom-hole pressure was 3,000 psi. in 10 minutes.

Previous tests in the well had recovered oil at 5,852-49 ft., 6,409-13 ft., and 6,426-34 ft. This is the most encouraging test to date in Sibley field area. The three producing wells in the field have had but one producing sand and there has been a different zone in each well. Also, there have been seven dry holes drilled in the area surrounding the producers.

The second test for West Lincoln field, Lincoln County, Lion Oil Co. 1 M. E. Allred, NW SW 23-6n-6e, ran a drill-stem test in the lower Tuscaloosa at 10,654-666 ft. and recovered 800 ft. of 40°-gravity oil. Through ¾-in. bottom and ¼-in. top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chokes, and using 2,500 ft. of water cushion, tool was left open for 30 minutes, and the well recovered 800 ft. of oil, 200 ft. of oil-cut mud, and 60 ft. of brackish water.

In Pickens field, Yazoo County, Carter Oil Co. 1 R. M. Bridgeforth, SW SW 30-12n-3e, has been abandoned as a dry hole at 7,920 ft. This test was a direct west offset to the Pickens field Lower Cretaceous discovery, Carter 1 Wilson. Operators are now planning to drill either an east or a northeast offset to the discovery well.

MISSISSIPPI WILDCAT FAILURES

Adams County: Humble Oil & Refining Co. 1 Hugh Y. Junkin et al, 12-8n-2w, dry, TD 7,100 ft.

Serio-Lewis-Latimer 1 David Junkin, 12-9n-2w, dry, TD 6,011 ft.

Lauderdale County: Thayer-Boswell et al 1 A. B. Harper Est., 7-6n-17e, dry, TD 4,075 ft.

Permian Basin

Big Lake Area Gets Sixth Pay Discovery

MIDLAND.—West Texas' first major oil-producing field, the Big Lake area of southwestern Reagan County, received its sixth pay discovery at Stanolind Oil & Gas Co. 1-BL University, on the southwest side of the field in the NW SW 1-2 University Lands. Stanolind's well added the Fusselman section of the Silurian to the other producing horizons.

The 1-BL University topped the Fusselman at 8,887 ft., minus 6,743 ft., reported to be low for the area. After setting casing to top of pay, the well flowed 55 bbl. of 60.8°-gravity distillate, plus 23 bbl. of wash water in 4½ hours through 7/16-in. tubing choke, from open hole at 8,887-8,940 ft., total depth. Gas was gaged at 7,000,000 cu. ft. daily and flowing pressures were 1,150 psi. on tubing and 600 psi. on casing. Following the 4½-hour test, the well flowed 18 bbl. of distillate in 30 minutes. In 2 hours, shut-in tubing pressure was 2,000 psi. Operators were tearing down the rig for completion.

In Ector County, a new pay and east extension on the northeast side of the Goldsmith area was assured at Amcan Oil Corp., Inc. 1 B. H. Blakeney, located 560 ft. out of the northwest quarter of the southeast of 14-A-PSL Survey. Both the upper and lower zones of the Clear Fork were reported as new producing horizons.

Following perforating of the lower Clear Fork at 6,150-6,200 ft., and before acid treatment, the well was swabbed down 200 ft. from surface when it kicked off and flowed 11 bbl. of oil the first hour through 21/64-in. choke, on gas-oil ratio of 630 cu. ft., then gaged 15½ bbl. the second hour through 23/64-in. choke, and 13 bbl. of oil the third hour on the same choke. Gas-oil ratio was 965 cu. ft. and casing pressure was 400 psi. the last 2 hours. After an acid treatment of 2,000 gal., the well flowed 20 bbl. of oil the first hour through 14/64-in. choke, 24 bbl. the second hour through 17/64-in. choke, and 28 bbl. of oil the third hour through 21/64-in. choke.

The upper Clear Fork was then perforated from 5,480-5,560, 5,590-5,650 and 5,680-5,735 ft. After swabbing, the well kicked off naturally and flowed an average of 28 bbl. of oil an hour for 6 hours, then shut in to acidize and test again before attempting dual completion.

Shell Oil Co. 1 M. H. O'Danel, SE SW 2-30-1N-T&P, northeast Howard County wildcat, flowed oil from the Pennsylvanian limestone, on a drill-stem test at 7,985-8,10 ft. The test was through ⅝-in. bottom and 1-in. top chokes. Fluid came to the surface in 4 minutes and in the next 36 minutes of the 40-minute test, the well flowed 33 bbl. of 46°-gravity oil. Bottom-hole flowing pressure was 3,205-3,298 psi., and shut-in pressure was 3,785 psi. in 20 minutes. Recovery in drill pipe was around 800 ft. of oil. Operators were to run electrical surveys for completion. Location of the new strike is about 8½ miles from the north county line and 4 miles west of the east line. It is approximately 5 miles north of Clear Fork production in Iatan-East Howard fields and 10½ miles southeast of East Vealmoor Pennsylvanian field.

In northwest Howard County, Brinkerhoff Drilling Co., Dallas, made location for its 1 E. Jones, a 9,000-ft. wildcat in NE NE 18-34-2N-T&P, 14 miles northwest of Big Spring and 11 miles southwest of production in the south extension area of the Vealmoor field. According to field sources, tools from the J. H. Snowden wildcat in northeast Lynn County were to be moved to the new site.

Texas Pacific Coal & Oil Co. has filed application for permit to drill an 8,500-ft. test in the shallow Crockett (Grayburg), field of northwestern Crockett County, and about 2 miles south of the Upton County line. The operation will be 1-G University, NE NE 16-14-University Lands Survey.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCAT

Scurry County: L. H. Armer and G. H. Chizum 1 C. M. Lyons, 467 ft. out of NW corner 119-3-H&GN, 2½ mi. S of Strawn production, TD 7,504 ft., open hole 7,456-7,504 ft., flowed 388.8 bbl. of 37°-gravity oil a day from "C" zone of Strawn, 12/64-in. choke, GOR 840 cu ft., TP 400 psi., small amount of water, elev. 2,483 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Borden County: Wheelock & Weinschel 1 H. Schilling, 44-25-H&TC, 1 mi. SE North Vincent field, TD 7,055 ft., elev. 2,329 ft., reef 6,965 ft.

Ector County: W. J. Weaver 1 J. E. Parker, NW NE 16-44-2S-T&P, 2½ mi. S Lawson-Simpson field, dry, TD 6,012 ft., elev. 3,146 ft.

Kent County: Seaboard Oil Co. and Republic Natural Gas Co. 1 B. & B. Wallace, NE NW 27-98-H&TC, 4 mi. S Clairemont field, dry, TD 7,274 ft., elev. 2,221 ft., lime 6,931 ft., Mississippian 7,230 ft.

Mitchell County: Ohio Oil Co. 1-A F. W. Merkett, SE NE 13-3-H&GN, 1 mi. E China Grove, on Mitchell-Scurry county line, dry, TD 7,690 ft., elev. 2,368 ft., Tubb 2,532 ft., Caddo 7,485 ft., Mississippian 7,543 ft., detrital 7,634 ft., Ellenburger 7,650 ft.

Pecos County: Carl Engle 1 Westerman, 2-604-GC&SF, 4 mi. SE Bakersfield, dry, TD 2,195 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Union Oil Co. of California 1 State-Fairbairn, 24-14s-31e, Chaves County wildcat, was drilling ahead at 10,780 ft. in limestone. Last reported formation top was the Wolfcamp at 8,846 ft., on elevation of 4,390 ft. Original objective was 10,000 ft., but at 10,065 ft., operators moved in a heavier rig.

Magnolia Petroleum Co. 1-C Santa Fe-Pacific, SE NW 21-9s-36e, northwest extension try to Crossroads field of Lea County, was drilling below 8,784 ft. in lime. Status of the field is 6 producing wells and 3 dry holes.

McAlester Fuel Co. 1-A Brownfield, NW NE 24-12s-37e, prospective lower Wolfcamp discovery, ran a 25-minute drill-stem test from 9,575-9,734 ft. Gas came to the surface in 5 minutes, mud in 8 minutes and oil in 10 minutes, but it was not allowed to flow. Recovery was 1,900 ft. of oil. Operators shut the test off in 25 minutes due to high gas pressure. Gas volume on the test was estimated at 2,000,000 cu. ft. daily. At last report it was to drill another 25 ft. and run a second test. The well was originally projected to 11,500 ft. On elevation of 3,884 ft., corrected, top of the Wolfcamp was 9,026 ft.

Amerada Petroleum Corp. 1-SA State, NW NE 35-14s-33e, 1½ miles northeast of the Saunders field discovery well, was drilling below 5,000 ft. in lime and shale. Projected depth was 10,500 ft. On elevation of 4,194 ft., it had top of the San Andres at 4,205 ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Eddy County: Magnolia Petroleum Co. 1 Hamilton-Federal, SE NE 5-20s-24e, 15 mi. SW Dayton, dry, TD 3,592 ft., elev. 3,850 ft., San Andres 686 ft., Glorietta 1,740 ft., Yeso 1,956 ft., Tubb 3,313 ft., Drikard 3,310 ft.

D. B. Sculley 1 Gorman, SW SW 4-26s-29e, dry, TD 3,150 ft., elev. 2,892 ft., salt 2,002 ft., Delaware lime 2,828 ft., sand 2,872 ft.

South Louisiana

New Discovery Indicated In Rapides Parish

NEW ORLEANS.—Two miles east of Glenmore, Rapides Parish, a new oil-field discovery is indicated at Texas Pacific Coal & Oil Co. 1 W. W. Elliott, 35-1s-2w. Saturated oil sand was cored at 10,436-42 ft. and operators ran a drill-stem test at this interval. Through ¼-in. top and bottom chokes recovery was 2,750 ft. of oil and water, with bottom-hole pressure of 3,125 psi. Operators then cored ahead and found the base of the main oil sand at 10,452 ft., making a solid 16-ft. oil sand from 10,436-52 ft. Coring was continued down to 10,517 ft., and 13½ ft. more sand was cored at intervals below the main pay.

In Manila Village field of Jefferson Parish, Tide Water Associated Oil Co. has staked location for a southeast offset to its 1 John Watt, which is reported to have five oil sands. The new well is 1 George F. Hessinger Estate, 35-18s-24e, and has a contract depth of 13,000 ft. In the 1 Watt, operators recently squeezed perforations at 13,340-60 ft. after production turned to 100 per cent salt water. They will reperforate the interval 13,340-50 ft.

Magnolia Petroleum Co. has reported a potential flow of 81 bbl. of condensate per day and 1,030,000 cu. ft. of gas through a ½-in. choke in its 1 Alice B. Rozas, St. Landry Parish wildcat, 65-6s-4e. The well was drilled to a depth of 14,000 ft. and production is through perforations at 11,412-22 ft. Gravity was 49.4°, and tubing pressure was 3,300 psi.

American Liberty Oil Co. is rigging up its 2 fee to test the Miocene sand in Avondale field of Jefferson Parish. Operator completed the 1 fee for a new sand in the field, but no official gage has been made as yet. Location of the new well is 67-13s-22e.

The 25 new locations staked in South Louisiana do not include any wildcat tests, except those searching for new sands in old fields. There were two successful exploratory tests completed, one each in Jefferson and St. Landry parishes, while two were dry, one each in Calcasieu and Rapides parishes.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Jefferson Parish: New pay at Avondale—American Liberty Oil Co. 1 American Liberty fee, 75-13s-22e, top pay 8,180 ft., TD 8,225 ft., perf. 8,180-86 ft., IP: 160 bbl. oil per day, ⅛-in. choke, TP 1,225 psi., 32.3° grav.

St. Landry Parish: Gas-condensate discovery—Magnolia Petroleum Co. 1 Alice B. Rozas, 41-6s-4e, 2 mi. NE of Opelousas, top pay 11,412 ft., TD 14,000 ft., perf. 11,412-22 ft., IP: 81 bbl. condensate per day, plus 1,030,000 cu. ft. of gas ⅛-in. choke, 49.1° grav., TP 3,600 psi.

SOUTH LOUISIANA WILDCAT FAILURES

Calcasieu Parish: W. T. Burton and Crown Central Petroleum Corp. 1 Evelyn B. Gray & Bowers, 2-10s-11w, dry, TD 10,261 ft.

Rapides Parish: Kemp Drilling Co. 1 Reeves, 28-5n-3e, ¾ mi. E of Deville, townsite, dry, TD 6,010 ft.

XUM

Rocky Mountain

Two Apparent Discoveries In Denver-Julesburg Basin

DENVER.—Two wells in the Denver-Julesburg basin of northeastern Colorado and southwestern Nebraska were apparent discoveries this week. Trigood Oil Co. of Casper tested 2,000 and 2,700 ft. of oil on two tests in the Dakota zone at 1 Couch, SE SE SE 19-6n-54w, in the Merino area, Logan County, Colorado. Top of the sand was logged at 5,090 ft. and on drill-stem test 5,091-5,105 ft. the well made 1,820 ft. of oil and 180 ft. of mud in 1 hour. An additional 15 ft. of sand showed good saturation and on test 5,105-20 ft. discovery was 2,700 ft. of oil with 800 ft. of water. The operator is now drilling below 5,259 ft. and expecting the Lakota zone.

Two miles south of the closest producer in Huntsman pool, Cheyenne County, Nebraska, Ginther-Warren-Ginther of Houston recovered 2,700 ft. of 38°-gravity oil on 30-minute drill-stem test in the second sand at 1 Dorman, SE SW NE 23-14n-50w. This well is considered on a separate producing structure from Huntsman pool, although exact limits of that pool have not been defined by Ohio Oil Co.

Ginther-Warren-Ginther hold 920 acres through the new area, and are now starting on a development program after setting casing on top of the oil producing sand. Operator logged a sand between 4,656-4,669 ft. and this zone showed approximately 4 million cubic feet of wet gas, but this zone is being cased off. This is the first operator to find oil in the western Nebraska area, other than Ohio which now has three producing pools.

A new discovery in the South Glenrock area is indicated following tests in the Muddy sand by Far West Oil Co. of San Antonio and Hancock Oil Co. of Los Angeles. The well is 1 State 7, SW SW SE 7-33n-75w, 2 miles southwest of the closest Muddy sand producer in Glenrock field, Converse County, Wyoming. Top of Muddy was logged at around 5,673 ft. and 10 ft. of well-developed saturated sand was cored between 5,673-83 ft., total depth. On drill-stem test 5,671-83 ft. the well made gas to the surface in 2½ minutes and flowed mud in 12 minutes, with clean oil in 14 minutes. Bottom-hole flowing pressure was 1,700 psi. on the test. The operator is now coring ahead in the sand. A part of the Far West-Hancock acreage is farmed out from Continental Oil Co. and Southern Production of Shreveport, J. G. Dyer of Denver, and others have holdings in the area.

Oil was recovered on test at an interesting extension in the Northwest Lake Creek area, Hot Springs County, Wyoming. The well is Pacific Western Oil Co. 4 Unit, SW NE NW 14-43n-92w, 1½ miles east of production in the unit proper. On 2-hour test in the Tensleep between 3,556-93 ft. the well made 1,575 ft. of oil and 230 ft. of highly oil-and-gas-cut mud. The operator is coring ahead in the formation. Production in the Northwest Lake Creek area was eetablished by Barnsdall Oil Co.-Sohio Oil Co. a year ago and two producing Tensleep wells have been completed in the field.

Continental Oil Co. has completed a new discovery ½ mile south of its Little Buck Creek field, Niobrara County, Wyoming, at 18 E.L.C.U."B," SW SW NE 35-36n-64w, for an estimated potential of 375 bbl. of oil daily. The well was drilled to 3,985 ft., total depth, in Second Dakota, which made water, and plugged back for completion between 2,922-48 ft. This zone swabbed and flowed 149 bbl. of oil in 6 hours, flowing 16 bbl. of clean 42°-gravity oil the last hour through 32/64-in. choke. The well is considered on a new high, south of previous production in Little Buck Creek field.

New locations.—There were 34 new locations, with 22 in Wyoming, 15 in Montana, and 1 each in western Nebraska and Colorado. Stanolind Oil & Gas Co. announced location for 1 Ferrell, SE NE NE 10-19n-43w, in the Southeast Alliance area, approximately 10 miles southeast of a previous wildcat failure. In Carbon County, Wyoming, Amerada Oil Corp. made location for a Cloverly test to around 8,500 ft. in the Deep Creek area, and location was announced by the same operator for two wildcats in its exploratory program through northern Crook County. The 1 Unit, NE NE NE 1-57n-68w, is at Blackbank Hill, and 2 Ormesher, NW SE NW 35-58n-68w, is in the Ligfhtning Flat area.

WYOMING WILDCAT FAILURES

Hyattville, Big Horn County: Victor Ziegler 1 Gapen, Tract 93, Sec. 2-49n-90w, 1,510 ft. TD; plugged and abandoned; Gypsum Springs 285 ft., Dinwoody 1,255 ft., Embar 1,318 ft., Tensleep 1,537 ft.

Prickly Pear, Crook County: Amerada Petroleum Corp. 1 Unit, C SW SW, 23-57n-67w, 1,510 TD; plugged and abandoned; Mowry 717 ft., Newcastle 928 ft., Dakota 1,223 ft., Fuson 1,379 ft., Lakota 1,409 ft., Morrison 1,467 ft.

North Cole Creek, Natrona County: General Petroleum Corp. 7-8-Govt., NW SW SW 8-35n-77w; 8,455 ft. TD; plugged and abandoned; Shannon 4,930 ft., Wall Creek 7,115 ft., Muddy 8,200 ft., Dakota 8,330 ft.; core top Lakota 8,417 ft.

MONTANA WILDCAT FAILURE

Hardin area, Bighorn County: H. I. Crowe 1 Reed-Snyder, SE SE NW 23-1s-32e, 4,000 ft. TD; plugged and abandoned; Muddy 1,666 ft., Dakota 1,811 ft., Lakota 2,196 ft., Morrison 2,235 ft., Ellis 2,446 ft., Embar 3,025 ft., Charles 3,234 ft., Tensleep 3,322 ft., Amsden 3,403 ft., Madison 3,489 ft.

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nia Co. 1 Unit, SE NW NW 35-5s-19e; 9,737 ft. TD; PB 8,950 ft., 7-in. casing at 8,699 w/350 sx; Duchesne River Surface, Uinta 1,000 (?) ft., Green River 5,454 ft., Wasatch 9,157 ft., pump approx. 35 bbl. oil per day.

NEBRASKA WILDCAT FAILURE

S. E. Alliance, Garden County: Stanolind Oil & Gas Co. 1 Eired, NE NE NW, 32-20n-45w; 3,825 ft. TD; plugged and abandoned; Pierre 1,076 ft., Niobrara 2,533 ft., Carlyle 2,905 ft., Codell 2,918 ft., Greenhorn 3,068 ft., Graneros 3,119 ft., Muddy 3,303 ft., Dakota 3,700 ft.

SOUTH DAKOTA WILDCAT FAILURE

Piedmont, Meade County: E. B. Kucera 2 Gingrass, NE SE SW 19-3n-7e; 2,155 ft. TD; PB 1,616 ft., plugged and abandoned; Minnekahta 800 ft., Madison 1,594 ft.

Kansas

Another Pool Opened in Graham County Activity

JONES, SHELBURNE & FARMER are opening another new producing spot in southeastern Graham County at their 1 Miller, NW NW NW 11-10-21, which swabbed at the rate of more than 25 bbl. of oil per hour in starting tests of Arbuckle lime. Previously, after plug was drilled out to total depth of 3,849 ft., oil had risen 2,800 ft. in the hole within 1½ hours. Swabbing was from 2,800 ft. off bottom. Hole is open from 3,841 ft. with top of the Arbuckle at 3,839 ft. (—1,556 ft.).

One of a rapid succession of discoveries which have been made in the area within recent months, the new well is 3 miles west of the main Morel pool.

Holl & Branine and associates 1 Zink, SE SE NE 13-18-11, prospective discovery well in eastern Barton County, had a 2,700-ft. oil fill-up overnight after drilling out plug to test Arbuckle lime at 3,284-86 ft. (—1,515-17 ft.). No water was indicated. The well is only ½ mile west of the Gemeinhardt pool but is separated from production by a dry hole.

Alpine Oil & Royalty Co. 1 Kowalski, SE SE NW 20-19-11, 1½ miles northeast of Ellinwood, also in Barton County, has encountered good oil showing in Arbuckle lime, topped at 3,369 ft. (—1,850 ft.). Rotary hole was carried to 3,374 ft. and 5-in. casing run to 3,371 ft. Promising showings previously had been found in the Lansing-Kansas City section, topped at 3,078 ft.

Opening of another new pool in central Stafford County is virtually assured by preliminary tests at Finston Co. and associates 1 Witt, NW NW NW 1-23-13. Following a small acid treatment (500 gal.) of the Arbuckle pay zone, the well swabbed 9 bbl. of oil in the first 8 hours. Hole is open below 3,811 ft. to a total depth of 3,820 ft. with top of the Arbuckle at 3,810 ft. (—1,951 ft.). Location is 1½ miles south of the Ahnert pool, nearest production.

In the northwest corner of Stafford County, Vickers Petroleum Co. has a prospective well at its 1 Frey, SW SW NE 7-21-14. A 30-minute drill-stem test at 3,716-22 ft. in Arbuckle lime topped at 3,715 ft. (—1,782 ft.) yielded 180 ft. of oil and gas-cut mud. The showing was considered sufficient to justify operators in running casing to test. Casing was landed 1 ft. in the top of the pay. Nearest production is 4 miles to the northeast in the Pritchard pool.

Harbar Drilling Co. has completed its 2 Baumgarten, SE SE NE 25-9-19, with a potential of 245 bbl. of oil per day to establish a new pool located a mile southeast of the Jelinek pool, Rooks County. Production is from Arbuckle lime at 3,621-29 ft. (—1,422-30 ft.).

Anschutz Drilling Co. 1 Grover, C EL NE NE 22-7-19, 2 miles northeast of Webster, Rooks County, found showings of heavy, black oil in Arbuckle lime, topped at 3,396 ft. (—1,461 ft.). Showings were in an interval at 3,410-25 ft. (total depth). Casing has been run to 3,411 ft. The well also is a prospective producer in the Lansing-Kansas section, in which a drill-stem test, perviously reported, at 3,275-90 ft. yielded 70 ft. of heavily oil and gas-cut mud.

What promises to be an unusually interesting wildcat test is being started by Stanolind Oil & Gas Co. at 1 Campbell, SW NW NW 26-6-2w, 12 miles southeast of Concordia, Cloud County, in the north central part of the state. The location, in the middle of the wide-open Salina Basin, is more than 50 miles to the south in Saline County.

KANSAS SUCCESSFUL WILDCATS

Graham County: Hansen et al 1 Bass, NW NW SW 12-10s-21w, elev. 2,272 ft., pumped 127 bbl. of 31.2°-gravity oil per day from Arbuckle topped at 3,826 ft., TD 3,833 ft.; anhydrite 1,748 ft., Topeka 3,281 ft., Heebner 3,485 ft., Toronto 3,505 ft., Lansing 3,526 ft., Simpson 3,809 ft.

Greenwood County: Butler & Jones 1 Hall, SW NW 33-25s-11e, pumped 60 bbl. of oil per day from Mississippian topped at 1,936 ft., TD 1,977 ft.

KANSAS WILDCAT FAILURES

Barton County: Gabbert & Jones 1 Kingston, NW NW SW 3-17s-14w, elev. 1,982 ft., dry, TD 3,522 ft., anhydrite 995 ft., Topeka 2,908 ft., Heebner 3,150 ft., Lansing 3,223 ft., Arbuckle 3,492 ft.

Butler County: National Associated Petroleum Co. 1 Smith, SW SW NW 29-28s-6e, elev. 1,405 ft., dry, TD 3,265 ft., Bartlesville 2,656 ft., Mississippian 2,781 ft., Arbuckle 3,175 ft.

Greenwood County: Derby Drilling Co. 1 Teeter, NW NW NW 36-23s-9e, dry, TD 2,344 ft., Lansing 1,386 ft., Kansas City 1,506 ft., Marmaton 1,872 ft., Cherokee 2,106 ft., Bartlesville 2,298 ft.

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PETROLEUM SERVICE DIVISION

Reno County: Vickers Petroleum et al 1 Guebelle, NE NE SW 20-26s-4w, elev. 1,447 ft., dry, TD 4,075 ft., Lansing 2,854 ft., Mississippian 3,610 ft., Kinderhook 3,896 ft., Misener 3,984 ft., Viola 4,045 ft., Simpson 4,062 ft.

Rice County: Ferrell Drilling Co. 1 Volkland, SW SW NE 35-18s-9w, elev. 1,E39 ft., Lansing 2,916 ft., Simpson 3,282 ft., Arbuckle 3,380 ft.

Rush County: Brunson Drilling Co. 1 Hagerman, SE SE NW 29-19s-16w, elev. 2,093 ft., dry, TD 3,878 ft., anhydrite 1,140 ft., Heebner 3,440 ft., Lansing 3,523 ft., Arbuckle 3,826 ft.

Saline County: Westgate-Greenland 1 Van Meter, SE SE SE 31-16s-1w, elev. 1,330 ft., dry, TD 2,682 ft., Mississippian 2,668 ft.

Sumner County: Adair et al 1 State Game Reserve, SW SE SE 4-33s-2e, elev. 1,130 ft., dry, TD 3,445 ft., Layton 2,640 ft., Marmaton 2,688 ft., Mississippian 3,155 ft., Kinderhook 3,291 ft., Simpson shale 3,356 ft., Simpson 3,366 ft., Arbuckle 3,411 ft.

Alpine Oil & Royalty Co. 1 Skibbe, SW NE 11-35s-1e, elev. 1,129 ft., dry, TD 3,759 ft., Topeka 1,751 ft., Lansing 2,354 ft., Layton 2,869 ft., Oswego 3,246 ft., Kinderhook 4,707 ft., Simpson 3,735 ft.

EASTERN NEBRASKA WILDCAT

Buffalo County, Kearney area: B & R Drilling Co. et al Huffstutter "F," NE NE NE 8-9n-15w, dry, TD 3,354 ft., Lansing 3,134 ft. with show of oil.

North Central Texas

Fry Production Extended Into Nolan County

WICHITA FALLS.—Completion of Drilling & Exploration Co. 1 S. B. Moore, SE SE 181-64-H&TC, 2 miles northeast of the town of Hylton, extended Fry sand production across the county line from Runnels into southeastern Nolan County. On potential test the well pumped 27 bbl. of 38°-gravity oil a day from a total of 52 perforations at 5,032-42 ft.

On elevation of 2,247 ft., the well logged the reef at 4,198 ft., upper Capps at 4,905 ft., lower Fry at 5,028 ft., and the Ellenburger at 5,792 ft. A drill-stem test in the upper Capps lime at 4,898-4,955 ft., open 2 hours, had gas in 70 minutes and recovered 2,450 ft. of oil-cut mud, and 1,400 ft. of salt water. Flowing pressure was 1,575 psi. A test from 5,025-38 ft. had gas in 23 minutes and showed distillate in 1½ hours, and recovered 145 ft. of oil and 60 ft. of heavily oil-and-gas-cut mud. A core from 5,038-44 ft. recovered 4 ft. of tight sand with oil show, and 2 ft. of sand with shale streaks and oil shows. A 2-hour test from 5,026-44 ft. recovered 145 ft. of oil. Further oil shows were found in sand from 5,432-47 ft. but a drill-stem test between 5,438-47 ft. recovered 20 ft. of lightly gas-cut mud. A 2-hour test from 5,817-31 ft. recovered 195 ft. of heavily oil and gas-cut mud. Operators treated with 500 gal. of acid from 5,803-31 ft., swabbed salt water with a light oil show, and plugged back to 5,041 ft.

Twenty perforations at 5,032-42 ft. tested dry, and 32 more shots were placed at the same interval and given a Hydrafrac treatment. It was loaded with oil, shut in 16 hours, then flowed 9 bbl. of oil in 1 hour and died; later pumped and flowed 30 bbl. of oil in 2½ hours.

NORTH TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: C. B. Christie 1 Mangold est., Blk. 18, Mangold Subd., McKinney & Williams Sur., 2 mi. NW Mankins, TD 3,641 ft., pay 3,626 ft., pumped 11.9 bbl. of 41°-gravity oil a day.

J. C. Mann, Jr. 1 Ernest Schrieber, Lot 68, Blk. 4, Clark & Plumb Subd., 2 mi. S Windthorst, TD 5,093 ft., Caddo 5,057 ft., pay 5,069 ft., pumped 48.7 bbl. of 41°-gravity oil a day, some water, GOR 200 cu. ft.

Coleman County: H. R. Burden & Dale Smith 1 Thompson Heirs, Blk. 3, A. Quigley Sur. 739, 3 mi. S Coleman, TD 2,335 ft., pay sand 2,302-11 ft., pumped 26 bbl. of 40°-gravity oil a day.

Jack County: Paul Bilbrey and Wayne Albritton 1 Singleton, Blk. 4, M. Rockerfellow Sur., A-484, 2 mi. NW Antelope, TD 756 ft., pay 748 ft., pumped 27.8 bbl. of 38°-gravity oil a day.

Montague County: H. O. Grace 1 C. E. Cunningham, S. H. Stephens Sur., A-683, 2 mi. NE St. Jo, TD 3,985 ft., PB 3,972 ft., elev. 998 ft., pay sand 3,971 ft., pumped 72 bbl. of 42°-gravity oil a day, plus 72 bbl. water, GOR 400 cu. ft.

Nolan County: Drilling & Exploration Co., Inc. 1 S. B. Moore, SE SE 181-64-H&TC, 2 mi. NE Hylton in SE corner of county, TD 5,831 ft., PB 5,048 ft., elev. 2,247 ft., lower Fry sand 5,028 ft., perf. 5,032-42 ft., pumped 27 bbl. of 38°-gravity oil a day, GOR 800 cu. ft.

Stonewall County: C. D. Norsworthy, Jr. 1 C. D. Wiley, 44-G-Alice Stephenson Sur., A-1797, 12 mi. NE Aspermont, TD 6,010 ft., elev. 1,645 ft., Caddo 5,847 ft., conglomerate 5,998 ft., pay 6,001 ft., flowed 152 bbl. of 39.6°-gravity oil in 12 hr., some water, 20/64-in. choke, GOR 500 cu. ft., TP 80 psi.

Taylor County: Geochemical Surveys 2 Tom Largent, Blk. 9, League 148, Grimes CSL, 1¾ mi. N Merkel, TD 4,630 ft., elev. 1,824 ft., Caddo 4,499 ft., pay 4,492 ft., pumped 102.6 bbl. of 41°-gravity oil a day, GOR 300 cu. ft.

NORTH TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Archer Dilling & Producing Co. 1 Kinder Lease, Lot 63, Blk. 5, Clark & Plumb, 6 mi. NE Archer City, dry, TD 1,310 ft., Gunsight lime 1,283-85 ft.

Archer Drilling & Producing Co. 1 Mrs. J. H. Roberson, Blk. 15, Harris Subd., 13 mi. W Archer City, dry, TD 1,422 ft., Gunsight lime 1,399-1,403 ft., sand with oil show 1,420-22 ft.

Bridwell Oil Co. 1 S. Freidberger, Lot 86, Blk. 4, Clark & Plumb, 7 mi. SW Windthorst, dry, TD 3,906 ft.

Wm. H. McCluskey 1 E. E. Threet, Sarah J. Williams Sur., A-786, 5 mi. SE Archer City, dry, TD 1,865 ft., elev. 1,050 ft., Gunsight lime 1,082-85 ft.

Perkins & Cullum 1 Titken "D," Blk. 12, Forgy Subd. Falls CSL, 4 mi. W. Anarene, dry, TD 5,474 ft., Gunsight 1,117 ft., Caddo 4,688 ft., Mississippian 5,170 ft., Ellenburger 5,307 ft.

Baylor County: Paul Bilbrey 1 H. D. Chandler, Sec. 26, Blk. 1, D&W Sur., 2½ mi. N Bomarton, dry, TD 1,765 ft. in shale.

Paul Bilbrey 1 Chas. F. Peters, 8-1-D&W, A-1693, 2½ mi. NW Bomarton, dry, TD 1,836 ft.

Coleman County: Creslenn Oil Co. 1 L. Weaver, A. Gabel Sur. 271, 6 mi. NE Coleman, dry, TD 2,190 ft. in sand.

Cooke County: D. H. Bolin and General American Oil Co. of Texas 1 Meador est., Mary Bruton Sur., A-58, 6 mi. NW Muenster, dry, TD 2,636 ft., elev. 1,163 ft.

Harvey Drilling Co. 1 W. Brittian, A. and R. W. Sharp, Hiram Walker Sur., A-1082, 6 mi. SE Gainesville, dry, TD 2,581 ft., elev. 754 ft.

Eastland County: C. W. Phayer 1 Brown, 17-3-H&TC, 4 mi. W Carbon, dry, TD 3,689 ft., elev. 1,612 ft., Caddo 2,765 ft., Marble Falls 3,218 ft., Ellenburger 3,661 ft.

Jones County: D. M. Myatt and W. B. Koch, Jr. 1 W. H. Myatt, Jas H. Warfield Sur. 10, 2 mi. NE Nugent, dry, TD 1,680 ft.

Shackelford County: Ungren & Frazier 1 Maxine Behr, Sec. 161, BBB&C Sur., 8 mi. NE Lueders, dry, TD 1,872 ft., oil shows 1,660-83, 1,816-20 ft.

Stephens County: Wimberly Drilling Co. 1 George Masters, Sec. 2075, TE&L Sur., 6 mi. SE Breckenridge, dry, TD 2,601 ft., elev. 1,374 ft., sand with oil show 2,430-37 ft.

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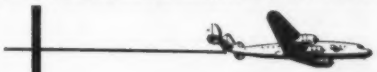

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& Refining Co. 1 J. A. Dickie, Nancy Williams Sur., A-926, NW corner of county, dry, TD 4,831 ft., elev. 1,204 ft., Strawn 2,944 ft., Caddo 3,830 ft., Mississippian 4,567 ft., Ellenburger 4,744 ft.

Wichita County: J. C. Gray Drilling Co. 1 J. M. Gaines, Blk. 48, Red River Valley Lands, 5 mi. W Burkburnett, dry, TD 1,854 ft., sand with oil show 1,851-54 ft.

Paul J. Pond and J. W. Williams 1 H. Willis, BBB&C Sur., A-29, 4 mi. SE Burkburnett, dry, TD 283 ft., water sand 276 ft.

Young County: Everett Johnston and C. G. Butts 1 L. Smith, Sec. 3401, TE&L Sur., 7 mi. SE Olney, dry, TD 917 ft., Gunsight lime 831-832 ft.

Kirtley Drilling Co. 1 J. Kisinger, P. Golden Sur., A-1312, 1½ mi. NE Herron City, dry, TD 3,200 ft., elev. 1,130 ft.

Ohio Fields

Several Successes Reported for Week

COLUMBUS.—Jay Hunt et al., 3 O. M. Mikesall, Section 7, Jackson Township, Muskingum County, came in with a good showing, natural, from the Clinton at 3,182-3,238 ft. In 14 hours, after shot, the well flowed 44 bbl. of oil and would make an estimated 100 bbl. in 24 hours.

In South Roseville pool, the National Gas 3 Frank Ramsbottom, Section 9, Harrison Township, Perry County, made a good show of oil and 135,000 cu. ft. of gas, natural, and 50 bbl. of oil and 200,000 cu. ft. in 124 hours after an 80-qt. shot.

A second gas well was brought in by Shuff & Bucy in the new pool in Clay Township, Knox County. The Clinton at 2,789-2,811 ft. on 5 J. E. Veatch, Lot 23, was shut in at 554,000 cu. ft. of gas, natural. The 4 Veatch had been completed on the same day as a small Berea pumper.

In Cambridge field, Gene Ward et al., struck 410,000 cu. ft. of gas, natural, in the Keener on 1 Preston Mercer, Section 14, Beaver Township, Noble County. The test was started for the Berea, topped the Keener at 995 ft., and was drilled to 1,003 ft.

Twenty-one locations scattered over 14 counties were reported for the week, shallow wells in Ashland County accounting for 5. Ashland field led in completions with 6 out of a total of 16.

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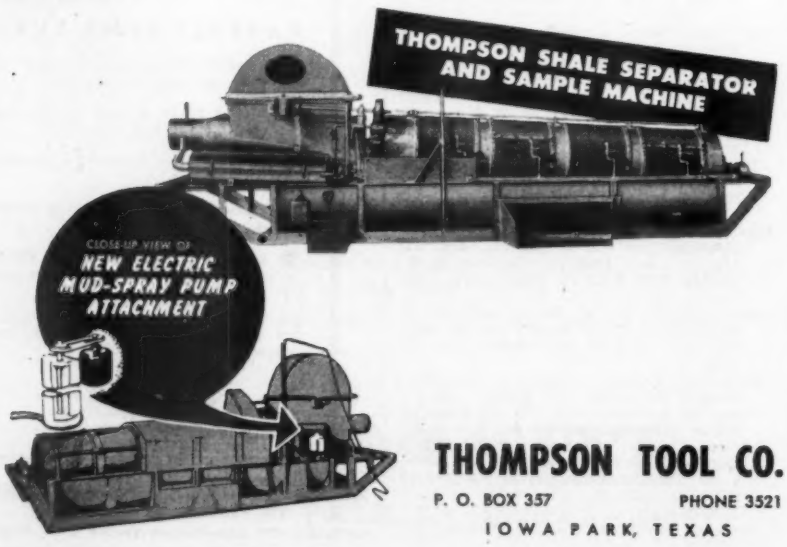

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IOWA PARK, TEXAS

Canadian Fields

Albercan to Test Potential Discovery

CALGARY.—Albercan Oil Corp., Western Canadian operating unit of American-financed Pancoastal Oils Group of Venezuela, has logged showings of heavy crude oil at its first wildcat in western Saskatchewan. The well has been cased, preliminary to testing potentialities. Meanwhile, Albercan's second Saskatchewan test is drilling, and location has been made for a third well.

The potential discovery is Albercan-Crown 22-35-26, LSD 2, 22-35-26w3, 8 miles south of Hearts Hill, 15 miles east of the Alberta border, and about 80 miles south and slightly east of Lloydminster-Lone Rock heavy crude field. The contractor, Falcon-Seaboard of Canada, Ltd., drilled the well to 3,100 ft., plugged back, and set 5½-in. casing to 2,672 ft., preliminary to testing the Cretaceous sands which gave oil encouragement. Whether commercial production can be obtained remains to be determined.

The corporation's second Saskatchewan wildcat is now drilling below 2,382 ft. Albercan-Crown 4-44-12, is in LSD 13, 4-44-12w3, about 5 miles northeast of Richard, and 25 miles west of North Battleford. The third venture, Albercan-Crown 20-34-23, will be located 4 miles west of Kerrobert, and about 18 miles east-southeast of the Hearts Hill well, in LSD 1, 20-34-23w3.

Albercan's drilling campaign follows a geophysical program undertaken on extensive Crown permits in Saskatchewan over the past year. Under a long term agreement with that province's government, the corporation is carrying out a two-million-dollar-plus exploration program.

Imperial Oil, Ltd., has recorded a discovery of natural gas with a small showing of oil plus salt water at its Stony Plain wildcat, located about 5¼ miles north of the recent North Woodbend 1, Lower Cretaceous oil discovery and D3 Devonian oil extension.

The new gas well, Imperial-Stony Plain 1, in LSD 8, 21-52-26w4, ran a 40-minute drill-stem test of the Cretaceous interval 4,097-4,115 ft., and received a gas blow which varied from 2,520,000-2,575,000 cu. ft. daily. The gas flow steadied off to 2,520,000 cu. ft. per day during the last 15 minutes of the test, and pipe recovery consisted of 10 ft. of oil, 2 ft. of salt water, and approximately 30 ft. of mud. Coring and testing is continuing at 4,155 ft.

Twenty-two wells were completed in Alberta during the past week, including 19 oil producers, 1 gas well, and 1 failure. Total completions up to July 7 now stand at 322 oil wells, 16 gas wells, and 89 dry holes.

EASTERN CANADA

James Bay.—Drilling for oil on the west shore of James Bay, in Northern Ontario, has commenced, according to an announce-

ment by Hon. W. S. Gemmell, provincial minister of mines. In 1948 and 1949 two holes were drilled in the general area, the first at Campbell Lake, northeast of Moosonee, and the second at Jaab Lake, 7 miles north. Both were abandoned. An area of some 20,000 sq. miles west of James Bay is underlain by Paleozoic formations similar to those which have produced oil and gas in southwestern Ontario.

Gaspe.—In the Gaspe peninsula, Quebec, Gaspe Oil Ventures, Ltd., of Montreal has started work on an 18-well drilling program.

Illinois-Ind.-Ky.

Richland County Wildcat Shows for Good Producer

DISCOVERY of a new producing area located about 4 miles east of Calhoun, in Richland County, Illinois, is indicated by good oil showings found by George & Wrather in their 1 Bert West, NE NE SW 34-3n-14w.

Showings were in the Rosiclare lime at 3,070-98 ft. In a 60-minute drill-stem test of this interval, gas showed within 3 minutes after the tool was opened, and 13 minutes later oil was at the surface and started flowing. In the break-down, 3,000 ft. of oil was recovered. There was no trace of water.

With bottom of the hole at 3,126 ft., operators have run 5½-in. casing through the section to 3,120 ft. The string has an alloy section opposite the prospective pay interval.

The well is only ¾ mile from production of the Bonpas pool but in a different formation. Production in the pool is from the deeper McClosky lime.

Stewart Oil Co. has another prospective new pool in southwestern Hamilton County, Illinois. Its 1 Johnson, NW SW NW 28-6s-5e, 1½ miles west of Rural Hill and about a mile from nearest production, yielded 360 ft. of free oil, 60 ft. of mud-cut oil and 60 ft. of oil-cut mud in a drill-stem test in the Aux Vases zone topped at 3,241 ft. The test took in an interval at 3,239-48 ft. Indicated bottom-hole pressure was 1,250 psi. Casing has been run for testing. The location is northwest of the active Cantrell pool, where good production is being developed in the same pay zone, and south of production in the Rural Hill pool.

Testing is under way at Ralph Halbert and associates 1 Waddle, NW NE SE 22-2s-13w, a prospective pool opener in Wabash County, Illinois. The well, located about 2 miles southeast of Keensburg, is about a mile east of production of the Keensburg Consolidated pool. It is only ¼ mile west of the Wabash River, the Indiana state line. Prospective production is in the Waltersburg sand at 1,950-69 ft. A 60-minute drill-stem test taking in an interval at 1,936-62 ft., resulted in a recovery of 90 ft. of clean oil and 120 ft. of mud-cut oil. No water was indicated.

B-S-L Drilling Co. 1 Schloot Heirs, NW SE SW 2-5n-7w, a rank wildcat, 6 miles from nearest production, in the extreme northeastern part of Knox County, Indiana, has been placed on the pump, making 40 bbl. of net oil and 10 bbl. of water per day. Production is from McClosky lime, in which casing, cemented at 888 ft., was perforated at 878-87 ft. Hole had been drilled to 1,251 ft., and then plugged back to the present pay zone. Nearest production is in the Plainville pool, northwestern Daviess County, whose main production is from the same zone at depths of 700 to 800 ft.

Jax Oil Co. has completed its 1 Barnett, SW NW NW NW 6-N-23, in the extreme southern part of Henderson County, Kentucky, near the Webster County line. It is a mile northwest of Poole and opens the Poole West pool. It pumped 9 bbl. of oil with 1 bbl. of water at completion. Pay

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zone is the Jackson sand, in which liner was perforated at 2,245-52 ft. Hole, drilled to a total depth of 2,745 ft., and plugged back to 2,258 ft., has been standing for more than a year. It was started by Fisher Oil Co.; then was taken over by C. E. Skiles, and lately by the present company.

In the meantime, Fred Meyer, Jr., has completed his 1 Allen, SW NW NW 6-N-23, a south offset to the discovery well, as an 80-bbl. pumper in Tar Springs sand at 1,866-75 ft., establishing a second productive horizon. Total depth is 1,880 ft. with 7-in. casing at 1,864 ft.

ILLINOIS WILDCAT FAILURES

Clinton County: R. M. Henderson 1 Koch, NE NE SE 5-2n-3w, dry, TD 1,276 ft.

Fayette County: L. B. Hoss 1 Hinton, NE NW SW 4-6n-3e, dry, TD 1,844 ft.

Gallatin County: C. E. Skiles 1 Abell, SE SW NE 26-8s-9e, dry, TD 2,953 ft.

Lawrence County: Gopher Drilling Co. 1 Soden, SE NE NE 12-2n-13w, dry, TD 1,669 ft.

Barron Kidd 1 Schrader, SE SW NW 30-2n-12w, dry, TD 2,585 ft.

Madison County: Joe Kesl, Jr., 4 Wolf, SE SW NW SW 32-6n-6w, dry, TD 772 ft.

Marion County: C. R. Winn 1 Blair, SE SW NW 24-1n-2e, dry, TD 2,382 ft.

Montgomery County: L. L. Benoist 1 Osterman, SW NW SE 11-7n-4w, dry, TD 1,048 ft.

Saline County: Sam Garfield 1 Patterson, NE NE SE 21-7s-5e, dry, TD 3,400 ft.

Talbot and Aberdeen Petroleum Co. 1 Harrelson, NE SW NE 29-7s-6e, dry, TD 3,250 ft.

Washington County: T. Metcalf and W. Duncan 1 Reinhart, NE NE SW 33-1n-3w, dry, TD 1,296 ft.

Wayne County: Calvert Drilling Co. 1 Ruble-Fitch, NE NE NE 25-1n-7e, dry, TD 3,300 ft.

White County: F. A. Noah and Aurora Gasoline Co. 1 Carter, NE NE SE 4-4s-9e, dry, TD 3,429 ft.

INDIANA SUCCESSFUL WILDCAT

Posey County: George S. Engle 1-A Esche, C S½ SE SE 10-6s-13w, IP 200 bbl., McClosky 2,830-33 ft., TD 2,833 ft. (New pay zone Oliver South pool.)

INDIANA WILDCAT FAILURES

Spencer County: National Associated Petroleum Co. 1 Saberson, SW NE SE 20-7s-6w, dry, TD 2,033 ft.

Sullivan County: G. H. Wickham 1 Hopper, NE NE NE 20-7n-10w, dry, TD 2,820 ft.

Vanderburgh County: John Buchman and Ashland Oil & Refining Co. 1 Frank, NW NE SE 20-6s-11w, dry, TD 2,654 ft.

Warrick County: Joe Reznick 1 Pecka, SW SE NE 25-6s-9w, dry, TD 2,046 ft.

L. F. Wilson 1 Sergesketter, SW SE NW 36-4s-6w, dry, TD 1,724 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCATS

Henderson County: Jax Oil Co. 1 Barnett, SW NW NW NW 6-N-23, IP 9 bbl., Jackson 2,245-52 ft., TD 2,745 ft. (Opens Poole West pool.)

Fred W. Myers 1 Allen, SW NW NW 6-N-23, IP 80 bbl., Tar Springs 1,866-75 ft., TD 1,882 ft. (Opens new pay zone Poole West pool.)

WESTERN KENTUCKY WILDCAT FAILURE

Webster County: J. Frank Hinckle 1 Reyburn, NE NE SE NE 4-L-23, dry, TD 3,267 ft.

EASTERN KENTUCKY

ASHLAND. — Prospect for new shallow production seems apparent in south-central Elliott County. At 1 Henry Ferguson, Virgin Oil Co. is testing Weir (Mississippian) sand at total depth 896 ft. Located in 6-S-78 along Briar Fork of Middlefork, test topped Weir at 821 ft. and with exception of one small shale break logged sand to total depth. Operators have shot with 100 qt.; are now cleaning out prior to pumping. Well is about 1½ miles from closest production.

In Big Sandy gas field, Pike County sector, United Fuel Gas Co. has completed the following wells: 6458 Gypsy York Johnson, 277,000 cu. ft. gas daily from Devonian black shale at total depth 3,104 ft.; 2 David Cox, 417,000 cu. ft. gas daily from Devonian shale and Berea sand at total depth 4,062 ft. In same field but in Martin County sector, United Fuel completed 6518 fee 20 for 327,000 cu. ft. gas daily from Devonian shale, Big lime, and Berea sand at total depth 3,127 ft.

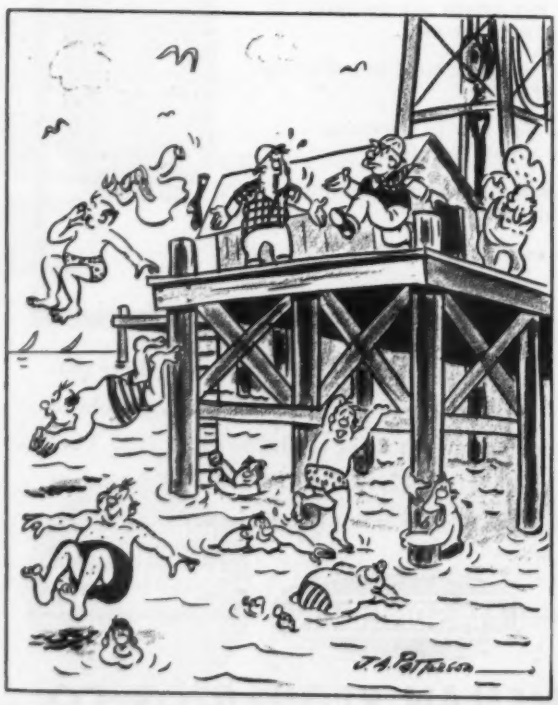
EASTERN KENTUCKY WILDCAT FAILURE

Knox County: Triangle Oil & Gas Co. 1 Stafford, 17-D-68, OWDD, OTD 2,115 ft., dry, TD 4,502 ft., Corniferous missing, show gas 3,766-3,722 ft., Knox 4,257 ft., hole full of water.

Appalachian Field

Oriskany Pool Gets Good Gasser

PITTSBURGH. — In the new Oriskany pool, northern Pennsylvania, Leidy Township, Clinton County, Godfrey L. Cabot, Inc., 1 Jessie B. Calhoun, elevation 1,049 ft., was brought in gaging 8,740,000 cu. ft. of gas in the Oriskany sand at a depth of 5,804 ft. The initial rock pressure was 4,200 psi., the same as that of Leidy Prospecting Co. 1 Calhoun Estate. Work has been started on a new deep test in Limestone Township, Lycoming County, Snee & Eberly 1 W. G. Snyder drilling at 185 ft. It is on the Williamsport Quadrangle. In Southwest Pennsylvania, Georges Township, Fayette County, Orville Eberly et al 1 N. E. Murphy, elevation 2,560 ft., completed running 7-in. casing at 7,790 ft. In



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Foreign: D. T. O'Connor, 500 Fifth Avenue, New York, N. Y.; Petroleum Industry Consultants, C. A., Caracas, Venez.; Denton-Spencer Co., Ltd., Calgary, Alberta, Canada.

Unity Township, Westmoreland County, Peoples Natural Gas Co. 1-3921 Fred Musnug, elevation 2,100 ft., is drilling at 2,934 ft., and in Napier Township, Bedford County, South Penn et al, Snee & Eberly 1 Jesse B. Miller, elevation 1,666 ft., are drilling out cement at 7,227 ft. The depth of the hole before encountering fishing job was 7,255 ft.

In Steele district, Wood County, West Virginia, Columbian Carbon Co. has started operations at 1-GW-1153 Godfrey L. Cabot (J. H. Stephens Tract) in the Limestone Hill area, elevation 809 ft. It is on the Belleville Quadrangle .55 mile south of Latitude 39°, 05′ and 2.20 miles west of Longitude 81°, 30′. This company is drilling 1-GW-1148 Godfrey L. Cabot (McLane Tract) at 2,586 ft. and 1-GW-1149 S. M. Wigal et al at 1,964 ft.; Godfrey L. Cabot, Inc. 1-S-1320 J. H. Brown is drilling at 4,900 ft., and 1-1329 O. E. Crow at 1,620 ft.; Hope Natural Gas Co. 9445 Frank Gilmore at 2,501 ft.; United Fuel Gas Co. 6465 O. H. Blair ran 7-in. casing at 5,285 ft.; W. & B. Gas Co. 1 Elbert and Myrtle Hale is rigging up. In Tucker district, Wirt County, Godfrey L. Cabot, Inc., 1-1328 fee (W. T. Gant Tract) is spudding at 50 ft. In Dry Fork district, Tucker County, Cumberland & Allegheny Gas Co. 1-A-425 Jason Harman, drilled through the Oriskany sand 8,413-8,561 ft., is now at a depth of 8,792 ft.

Twenty-nine new locations in West Virginia were reported during the past week.

Pipe-Line Construction

(Continued from page 116)

and south of Eunice, La. (361.1 miles is for main line and 255 miles for gathering lines.) Contracted as follows:

Schedule A.—Mercedes to south of Falfurrias, Tex., 80.1 miles 10 to 14-in. main line; Massey Pipe Line Construction Co., contractor; work to start in April or May.

Schedule B.—South of Falfurrias to Edna, Tex., 153.1 miles, 24 and 26-in. (H. B. Zachary Co., San Antonio, has contracted laying of 108 miles 24-in. in Schedule B.) Remaining 45 miles yet to be contracted. Work starts September 1.

Schedule C.—Edna to Porters, Tex., 114.9 miles, 26 and 30-in., to start in August. Contract to be announced.

Schedule D.—Porters to Sabine River, 91.5 miles, 30-in., contracted by Texas Southern Contracting Co., Fort Worth.; work to start in July.

Schedule E.—Sabine River to Eunice, La., 81.5 miles, 30-in., contracted by Anderson Brothers Corp., Houston; work starts in July; field office, Elton, La.; spreadman, Arnold Smith.

Texas Unit I.—Gathering laterals to begin in May; El Campo, Tex., area, 58 miles 4 to 14-in., contracted to T. & R. Construction Co., Houston. Wharton, Tex., area, 98 miles, 6 to 14-in., contracted to Altgelt Construction Co.

Texas Unit II.—Work to start in May; Sinton, Tex., area, 38 miles, 4 to 8-in., contracted to Shanks & Eustace, Inc., Alice, Tex.; Dix, Tex., area, 61 miles 6 to 10-in., contracted to Victoria Oil Field Maintenance Co., Victoria, Tex.

Schedule 7—86 miles of 30-in., Georgia, South Carolina, being started by Williams Brothers Corp. Spread under T. E. Davis; field office, Elberton, Ga.

Schedule 8—102 miles of 30-in., and Schedule 9, 100 miles 30-in., in South Carolina and southern Virginia, contracted to R. H. Fulton & Co.; operations under way in northern South Carolina; A. A. Corrigan, supt.; Clark Williams, general supt.

Schedule 10—86 miles of 30-in., and Schedule 11, 110 miles 30-in., contacted to Smith Contracting Corp.; work under way, R. M. Jones spreadman; field office, Altavista, Va.; to go east to meet spread to be put in field later under C. C. Craig; offices, Herndon, Va.; which will work west from Potomac River.

Schedule 15—24 miles of 30-in., northern end running to Hudson River, under construction; Oklahoma Contracting Corp.; M. E. Shiflett, spreadman; office, Edgewater, N. J.; Omaha Dredge & Dock Co., preparing laying of 30-in. across Hudson River in May.

85 miles, 4 to 14-in., gathering system, South Louisiana; J. B. Latham, superintendent; headquarters, Vinton, La.; Latex Construction Co., contractor.

50 miles, 18-20-in., gathering line, South Louisiana; O. R. Burden Construction Co., contractor.

Trunkline Gas Supply Co.—1,775 miles, 10-26-in., planned; includes 740-mile, 26-in. main line from Lake Charles, La., to Tuscola compressor station on Panhandle Eastern Pipe Line Co., (approved), and 1,035 miles, 10-24-in., Lake Charles, La., to McAllen, Tex., field lines, pending FPC approval of changed plans. Contracted as follows: Section A, main line, 176 miles 26-in., Longville to Darnell, La.; Houston Contracting Co.; Section I, lateral line, 33 miles 20-in., 18 miles 16-in., 8 miles 10-in., Longville, La., south; Houston Contracting Co.; Section B, main line, 180 miles 26-in., Darnell, La., to Senatobia, Miss.; Anderson Bros. Corp.; Sections G and H, lateral line: 217 miles 24-in., Longville, La., to Altair, Tex.; Anderson Bros. Corp.; Section C, main line: 184 miles 26-in., Senatobia, Miss., to Joppa, Ill.; R. H. Fulton & Co.; Section D, main line, 186 miles 26-in., Joppa to Tuscola, Ill.; Mahoney Contracting Co.

United Fuel Gas Co.—32 miles, 20-in., authorized; Roane, Calhoun, and Wetzel counties, West Virginia.

United Gas Pipe Line Co.—90 miles, 16-in., planned, West Bay field to New Orleans.

105.6 miles, 20-in., authorized, loop line paralleling Carthage, Tex.-Sterlington, La., and extending on to near Monroe, La.

26 miles in Louisiana conecting with East Texas system, planned.

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XUM

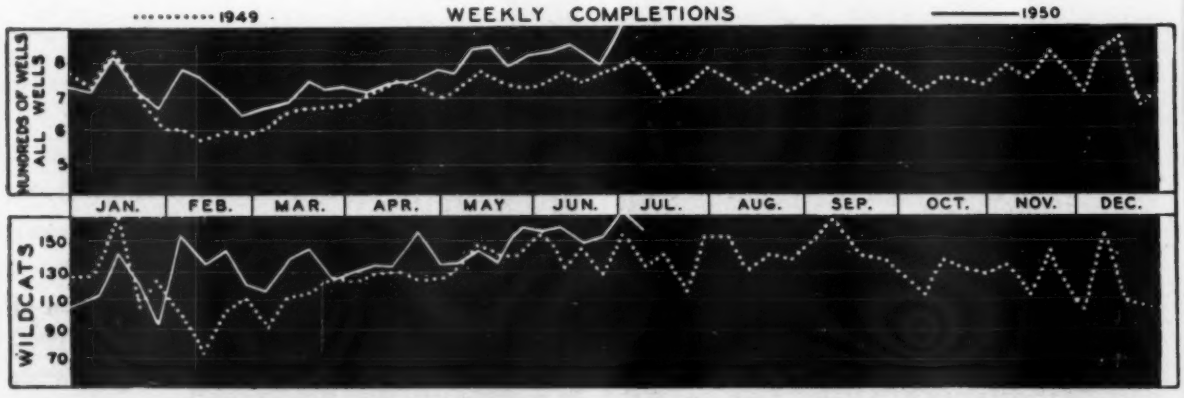
CURRENT STATISTICS

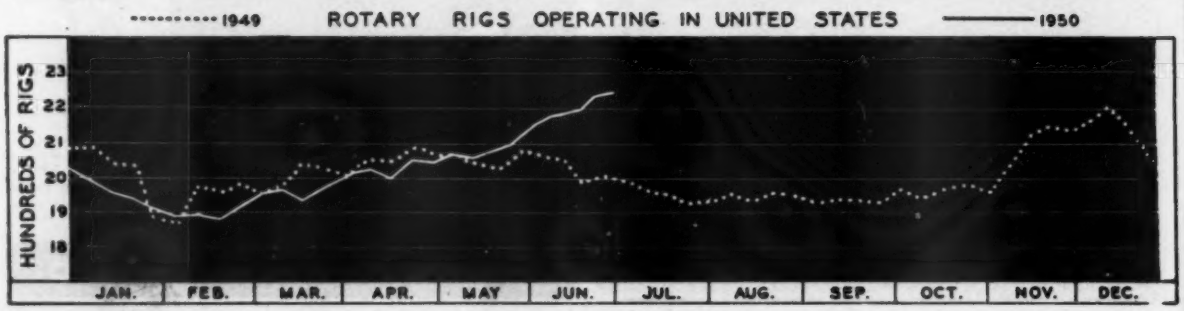
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED JULY 8, 1950

	Total of all wells					July 8		Wildcat completions and discoveries									
													Cumulative total, 1950				
	Comp.	Oil	Gas	Dry	Footage	1950	1949	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	10	5	0	*5	11,727	222	610	0	0	0	0	0	0	0	0	0	0
Pennsylvania	10	4	2	†4	23,512	493	960	0	0	0	0	0	0	0	0	2	2
West Virginia	10	0	9	1	22,619	324	256	0	0	0	0	0	0	0	10	12	22
Ohio	16	7	4	5	29,801	490	573	0	0	0	0	0	1	0	1	7	9
Indiana	35	15	0	20	67,102	720	644	1	0	0	5	6	20	0	1	136	157
Kentucky	26	14	4	8	48,388	498	459	2	0	0	2	4	12	0	1	42	55
Illinois	63	30	0	33	141,323	1,319	1,255	0	0	0	13	13	28	0	1	291	320
Michigan	24	9	0	‡15	58,024	416	492	0	0	0	8	8	18	0	4	131	153
Kansas	86	43	5	§38	267,592	1,884	1,604	2	0	0	9	11	48	0	4	300	352
Nebraska	3	1	0	2	12,129	49	15	0	0	0	2	2	1	0	1	22	24
Oklahoma	125	82	6	¶37	442,690	2,735	2,201	5	0	2	10	17	86	5	11	335	437
Texas	365	255	13	97	1,616,313	8,173	7,082	11	0	2	52	65	247	19	65	1,295	1,626
North Central (Dist. 7-B & 9)	103	56	0	¶47	280,127	2,505	2,263	8	0	0	19	27	105	2	17	492	616
West (Dist. 7-C & 8)	133	121	1	11	719,482	2,384	1,684	1	0	0	5	6	50	2	2	250	304
Panhandle (Dist. 10)	12	10	2	0	40,440	477	552	0	0	0	0	0	1	0	2	11	14
Eastern (Dist. 5, 6, & 6-P)	12	8	1	3	41,673	604	462	0	0	0	2	2	8	3	1	106	118
Gulf Coast (Dist. 2 & 3)	54	36	4	14	329,993	1,147	1,041	1	0	2	10	13	40	7	24	179	250
Southwest (Dist. 1 & 4)	51	24	5	22	204,598	1,056	1,080	1	0	0	16	17	43	5	19	257	324
Louisiana	53	33	1	19	278,859	1,218	1,095	1	1	0	5	7	29	10	4	98	141
Northern	32	19	1	12	103,403	640	589	0	0	0	3	3	4	1	1	43	49
Southern	21	14	0	7	175,456	578	506	1	1	0	2	4	25	9	3	55	92
Arkansas	4	2	0	2	14,585	194	160	0	0	0	2	2	3	0	0	49	52
Mississippi	8	1	1	6	53,133	173	191	0	0	0	3	3	8	2	0	60	70
Southeastern States	1	1	0	0	3,362	33	24	0	0	0	0	0	1	0	1	19	21
Montana	3	2	0	1	9,914	90	115	0	0	0	1	1	1	0	0	13	14
Wyoming	16	5	0	11	65,899	295	305	0	0	0	3	3	9	0	0	34	43
Colorado-Utah	1	1	0	0	9,757	32	61	1	0	0	0	1	1	0	0	23	24
New Mexico	9	6	0	3	19,731	319	291	0	0	0	2	2	10	1	0	28	39
California	39	26	1	12	155,901	893	1,408	1	0	0	11	12	13	0	2	183	198
Miscellaneous	1	0	0	1	2,155	9	15	0	0	0	1	1	0	0	0	9	9
Total United States	908	542	46	320	3,354,516	20,579	19,816	24	1	4	129	158	536	37	106	3,089	3,768
Total previous week	911	535	57	319	3,481,173	....	....	27	3	6	143	179	512	36	102	2,960	3,610
Total July 8, 1949	823	465	69	289	2,847,436	....	....	22	1	7	104	134	476	49	98	2,811	3,434

Service wells included: *5, †4, ‡3, §1, ¶2.





DAILY AVERAGE PRODUCTION FOR WEEK

	July 8 crude oil	B. of M. July demand	July 1 crude oil
Alabama	1,850	1,600	1,800
Arkansas	79,800	89,000	79,550
California	883,000	860,000	873,500
Colorado	60,100	68,000	59,900
Eastern	62,600	63,000	62,400
Florida	1,525	1,400	1,500
Illinois	176,900	186,000	170,200
Indiana	31,700	30,000	29,700
Kansas	289,600	290,000	287,750
Kentucky	29,200	28,000	25,600
Louisiana	563,550	565,000	562,950
North Louisiana	118,250	.....	118,150
South Louisiana	445,300	.....	444,800
Michigan	39,800	47,000	44,300
Mississippi	106,200	110,000	110,650
Montana	21,900	25,000	22,100
Nebraska	2,100	3,000	2,100
New Mexico	132,575	148,000	127,525
Oklahoma	433,900	445,000	428,850
Texas	2,329,900	2,190,000	2,317,700
Dist. 1 (Southwest)	29,450	.....	29,275
Dist. 2 (Southwest)	138,875	.....	138,000
Dist. 4 (Southwest)	218,000	.....	216,850
Dist. 3 (Gulf Coast)	390,150	.....	392,050
Dist. 5 (Eastern)	36,200	.....	35,875
Dist. 6 (Eastern)	93,600	.....	92,875
East Texas field	275,400	.....	276,350
Dist. 7-C (West)	57,725	.....	57,100
Dist. 8 (West)	772,775	.....	763,650
Dist. 7-B (W. Central)	72,100	.....	71,700
Dist. 9 (N. Central)	153,100	.....	151,500
Dist. 10 (Panhandle)	92,525	.....	92,475
Utah	3,550	4,000	3,500
Wyoming	158,200	156,000	158,200
Total United States	*5,407,950	5,310,000	5,369,775
Change from previous week, up	38,175		
Canada	70,745	.....	71,520

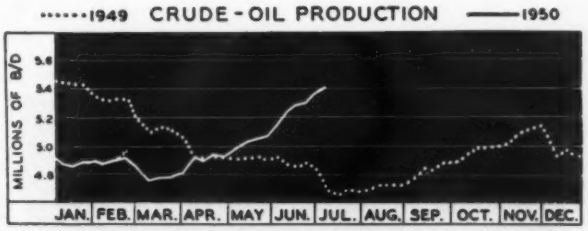
Total U. S. production January 1-July 8 ..... †960,648,465 bbl.
Same period last year (crude plus cond.) ..... 976,476,845 bbl.

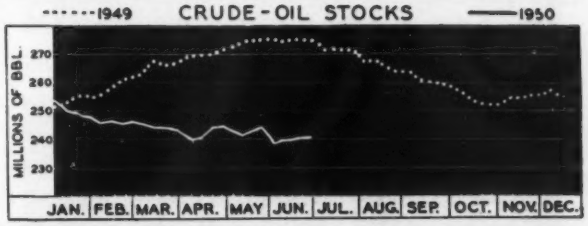
*Not incl. 97,375 bbl. condensate. †Incl. 18,415,915 bbl. condensate.

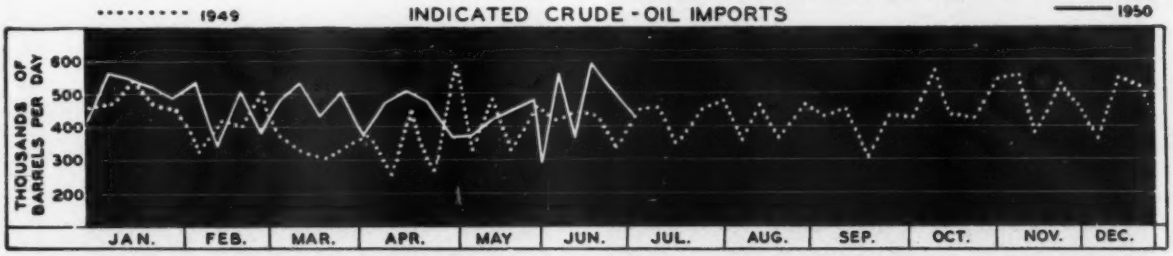
CRUDE-OIL STOCKS BY STATES OF ORIGIN*
(Thousands of barrels)

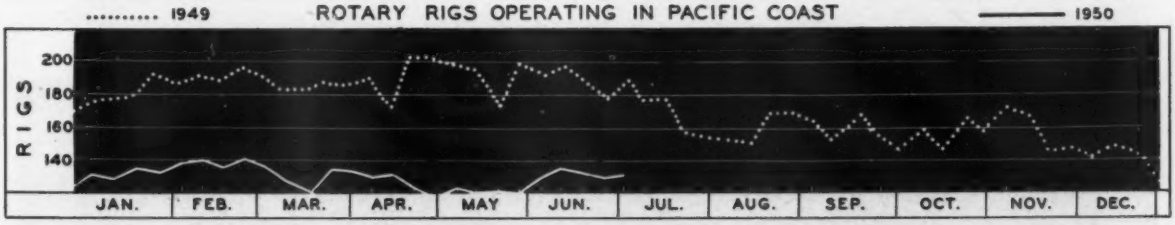
	July 1, 1950	June 24, 1950	July 2, 1949
Pennsylvania Grade	2,884	2,878	3,048
Other Appalachian	1,578	1,684	1,965
Illinois, Indiana, Michigan	8,834	9,100	14,356
Arkansas	3,071	3,093	3,022
Louisiana	15,536	15,635	14,999
North	3,765	3,736	3,384
Gulf	11,771	11,899	11,615
Mississippi	2,176	2,225	3,178
New Mexico	5,894	5,672	7,642
Oklahoma and Kansas	34,125	33,787	40,152
Texas	112,399	112,344	129,249
East Texas	15,787	15,801	18,272
West Texas	41,952	41,255	51,568
Texas Gulf	27,221	27,361	30,150
Other Texas	27,439	27,927	29,259
Rocky Mountain	12,646	12,533	13,907
California	35,495	35,149	34,651
Foreign	6,305	6,662	8,144
Total	240,943	240,762	274,313

*Bureau of Mines.







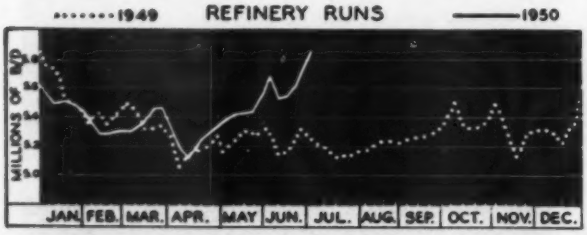


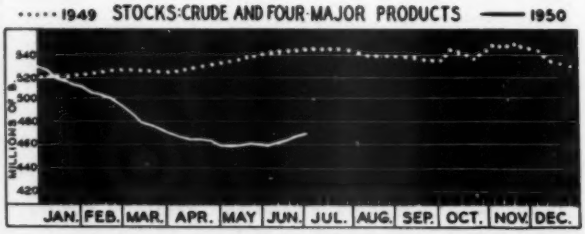
A.P.I. REFINERY REPORT, JULY '1

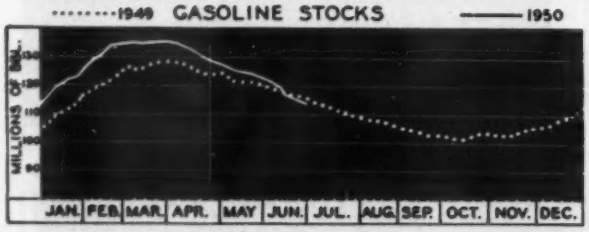
(Thousands of barrels)

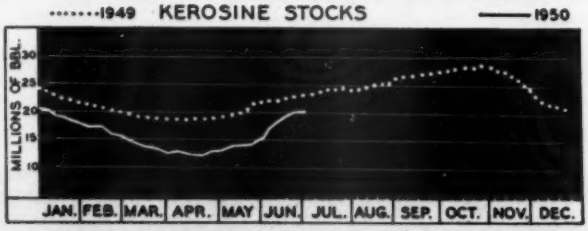
District—	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline†	Kerosine	Distillate	Residual	Bureau of Mines, June 1949: Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	966	382.6	32.6	230.1	195.0	26,004	7,203	13,786	10,191	694	285.9	24.3	114.0	143.9
Appalachian:														
District 1	101	44.0	4.4	12.1	10.4	2,374	387	593	345	90	42.8	3.1	8.5	6.3
District 2	69	35.0	4.9	6.3	14.7	900	118	186	202	58	29.9	1.8	4.7	10.7
Ind., Ill., Ky.	1,049	553.7	61.2	165.0	154.1	22,747	4,014	8,003	3,474	865	487.6	40.8	103.3	121.3
Okla., Kans., Mo.	490	277.7	11.6	94.7	58.3	12,160	1,083	4,872	1,249	423	236.1	18.8	81.3	57.2
Inland Texas	223	155.0	12.4	29.7	43.9	3,337	470	1,176	711	217	161.5	11.6	19.2	45.6
Texas Gulf Coast	1,295	592.2	92.4	274.1	208.3	16,517	3,372	8,143	4,026	1,236	647.8	68.5	170.1	224.9
La. Gulf Coast	477	229.7	56.0	95.9	63.4	5,543	2,804	3,353	1,866	401	215.5	29.9	94.0	41.8
N. La. and Ark.	53	24.9	5.4	10.4	8.9	2,672	380	493	193	76	32.8	6.2	11.9	15.9
Rocky Mountain:														
New Mexico	13	7.1	0.4	1.9	2.7	106	25	62	37	11	5.8	0.3	1.8	2.7
Other Rocky Mtn.	192	85.1	2.9	37.6	35.0	4,674	387	1,359	650	170	77.1	4.7	30.2	31.3
California	926	398.3	25.7	125.3	325.4	17,105	986	11,309	17,598	921	373.8	13.8	132.2	339.0
July 1, 1950	5,854	2,785.3	309.9	1,083.1	1,120.1	114,139	21,229	53,335	40,542	5,162	2,596.6	223.8	771.2	1,040.6
June 24, 1950	5,636	2,803.7	285.9	981.1	1,065.9	115,036	20,165	50,580	41,291	.....	.....	.....	.....	.....
July 2, 1949	5,241	2,642.6	224.9	777.1	1,104.7	114,000	23,616	64,587	65,741	.....	.....	.....	.....	.....

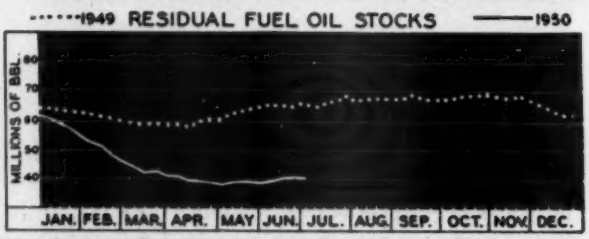
*At refineries including natural blended. †Finished and unfinished.











CRUDE PRICES

GRAVITY SCHEDULE

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.63	....	....	....
19-19.9	1.72	....	....	....
20-20.9	1.80	$2.25	....	$2.12
21-21.9	1.89	2.27	....	2.14
22-22.9	1.97	2.29	....	2.16
23-23.9	20.6	2.31	....	2.18
24-24.9	2.14	2.33	$2.56	2.20
25-25.9	2.23	2.35	2.58	2.22
26-26.9	2.31	2.37	2.60	2.24
27-27.9	2.37	2.39	2.62	2.26
28-28.9	2.42	2.41	2.64	2.28
29-29.9	2.48	2.43	2.66	2.30
30-30.9	2.54	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.64	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Above changes do not include recent reductions of a few buyers applying principally to low-gravity grades.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.77
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	3.75
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

RESIDUAL fuel continues as the problem child of petroleum marketing. Supply and demand are rarely in balance. Since it is the only petroleum product in direct day-to-day competition with fuel outside the industry, a change in price will have an immediate effect on demand as well as supply.

Esso Standard Oil Co. announced an increase of 10 cents a barrel in its Gulf Coast residual postings in an effort to bring supply and demand more nearly in balance. The increase was effective July 5. The Gulf Coast price change was reflected in a 10-cent boost by most suppliers in the New York Harbor area, and the general tightness of the heavy-fuel market will probably stabilize prices at the new level.

Total residual-fuel stocks decreased 749,000 bbl. during week ended July 1, a period when heavy-fuel inventories should be climbing. Residual-fuel stocks normally start increasing about the middle of April, but the gain this year has been less than 700,000 bbl. with decreases in 6 out of the last 11 weeks. East-of-California stocks are about 8,000,000 bbl. less than last year.

Heavy-fuel inventories in the Oklahoma-Kansas district are about half the midyear inventories of last year, but some of the sales on the low side of the spot market are moving at prices being paid in July by the railroads. This is 5 cents a barrel less than in June. Reports indicate that some buyers are holding off, expecting a price drop. However, the relatively low level of stocks in all areas reduces the probability of extensive forced selling this summer. At least some refiners believe that prices will increase enough between now and winter to make inventory building profitable. The delay may be expensive for buyers.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotation of leading suppliers as of July 10, 1950. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅛-10½	12.25	10¾-11½
Premium gasoline, 86-88 octane	10¾-11½	13.25	11½-12¼
42-44 w.w. kerosine	8¼-8½	9.1	8-8½
No. 2 straw fuel oil	7⅛-7⅜	7.6-8.0	7-7¼
No. 6 residual	$1.60-1.70	$2.05-2.15	$1.75-1.80

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5⅜	4⅞	5⅛
Grade 18-55	6.45	5.95	6.2

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	11.5
750 vis., No. 3-4 neutral	13.75
2,000 No. 5-6 neutral	15.5

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	18.5-19
200 vis., No. 3 neutral, 0-10 pp.	12.5

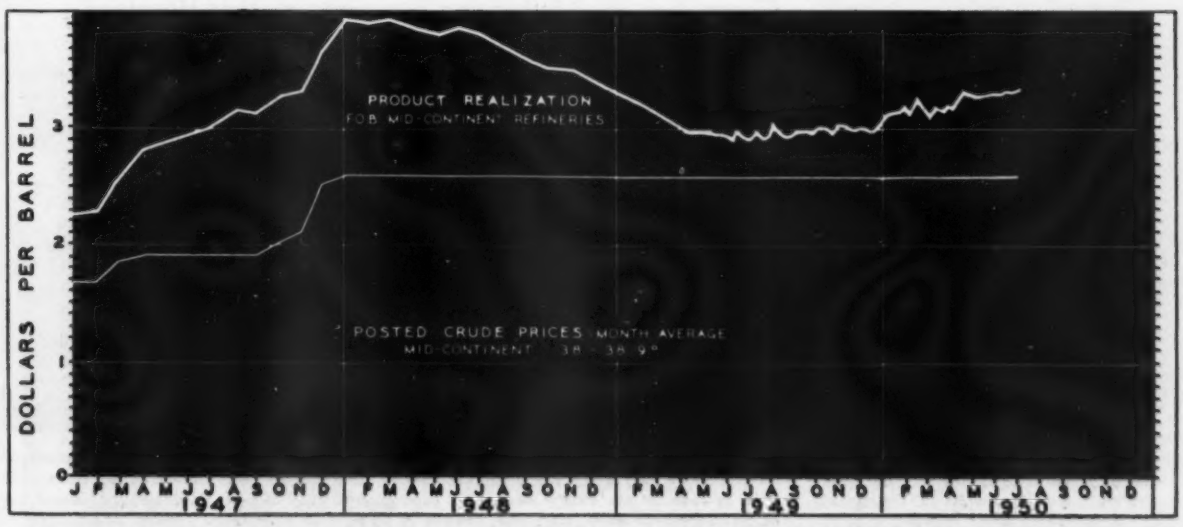
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	21-21.5
180 vis., 0 p.t. neutral	22-22.5

WAX

Mid-Continent

132-134 A.M.P.	4.50


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
0
1
2
3
J F M A M J J A S O N D
1947
F M A M J J A S O N D
1948
F M A M J J A S O N D
1949
F M A M J J A S O N D
1950

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.35 for week ended July 1, $3.33 for previous week, and $2.97 for June 1949.

XUM

EQUIPMENT MEN . . . in the News

McClendon Is Elected Halliburton President

Erle P. Halliburton, chairman of Halliburton Oil Well Cementing Co., has announced the appointment of Wallace R. McClendon as president,

W. R. McCLENDON

L. B. MEADERS

following the annual board of director's meeting.

McClendon has served as vice president in charge of field operations since 1942. Retiring as president is

R. B. EMERY

WILFRED TAPPER

John C. Halliburton, associated with the company since 1932 and president since 1947.

After incorporation of Halliburton in 1924, McClendon headed the company's Gulf Coast operations at Houston until 1942, when he moved to the Duncan home office as vice president in charge of field operations.

W. D. OWSLEY

GROVER KILGORE

Other announcements at the meeting were as follows: L. D. Campbell, vice president and secretary-treasurer, was elected a member of the board of directors. L. B. Meaders succeeded McClendon as vice president in charge of field operations; Ralph R. Emery was elected vice president in charge of foreign operations; Wilfred Tapper was elected vice president of electrical well services; W. D. Owsley was elected vice president and technical advisor to executive officers; and Grover Kilgore was elected vice president in charge of sales and advertising.

R. G. Kelly, Midland, Tex., who has been superintendent of Halliburton's West Texas-New Mexico division, was promoted to the position of regional manager of the central region. The new regional manager fills the position vacated by Meaders.

Salvatori Forms New Geophysical Firm

Henry Salvatori has announced the formation of Western Geophysical Co. of America, a completely independent contracting company in which he holds the entire stock.

The new company will take over all of the seismograph, gravity-meter, and other exploratory operations of the firm presently known as Western Geophysical Co.

Activities of Western Geophysical will be under the direction of Salvatori, and all supervisory and field operations will be conducted by the personnel and with the same equipment as heretofore.

Officers and directors of the new company are as follows: Henry Salvatori, president and director; Dean Walling, vice president and director; V. E. Prestine, vice president and director; S. J. Chester, secretary and director; J. A. Holton, treasurer and director; and Booth B. Strange, director.

Haslup is Sales Manager R-P&C Valve Division

Charles L. Haslup was recently appointed sales manager of the R-P&C Valve division of American Chain & Cable Co., Inc., with headquarters at Reading, Pa.

Stephenson to Assist Merla's Chief Engineer

D. W. Henke, president of Merla Tool Corp., Dallas, has announced the appointment of A. D. Stephenson, Jr., as assistant to the chief engineer, M. M. Livingston.

Stephenson, who is a recent graduate of Southern Methodist University engineering school, will concentrate on experimental design and the development of modern techniques of gas-lift production.

Sperry-Sun Well Surveying Engineers Meet in Houston

Sperry-Sun Well Surveying Co. sales and service engineers reviewed new and improved developments and made plans for the coming year during their annual sales conference held in June at the firm's oil-country headquarters at Houston. Engineers in attendance at the conference were: front row, Beverly Morgan, Ross R. Blakely, John B. Peddy, Bert A. Cabaniss, Harry M. Lowe, and W. F. (Bill) Krueger; middle row, Quentin B. Marsh, A. J. (Jack) Goolsbee, R. E. (Bob) Keyes, J. V. (Johnny) Evans, and R. L. Perkins; and back row, A. B. Palmer and S. H. Williston.

ICI To Open New Service Operation at Odessa

International Cementers, Inc., will open a new operation in West Texas next month with headquarters at

R. D. FAGAN

JERRY ORMAND

Odessa, according to a recent announcement by Bob Harcus, general manager of ICI.

Besides oil-well cementing the company will offer Perfo-Jet (casing perforating) and Strata-Jet (formation penetrating) in West Texas fields.

Permanent buildings now being erected at Odessa include an office building, garage and shop, and a twin-silo bulk plant for handling cement and light-weight aggregate. Equipment to be based at Odessa will consist of six cementing units, eight bulk transport trucks, two Perfo-Jet shooting trucks, plus miscellaneous service cars and trucks.

R. D. Fagan has been named division manager with Jerry Ormand, originally from Longview, as his assistant.

Clevelander Buys Leader Iron Works at Decatur

J. H. PETERS

The controlling interest of Leader Iron Works Co., Decatur, Ill., has been acquired by Julius H. Peters, formerly associated with Colonial Iron Works Co. of Cleveland.

Leader Iron Works specializes in the manufacture of large steel and alloy chemical processing equipment, and bulk, underground, and farm oil-storage tanks. There is an operating plant of 66,000 sq. ft. production area in Decatur, and a normal employment of 120 people.

New officers elected at the first directors' meeting were Julius H. Peters, president and treasurer, E. Donald Peters, vice president, and Clarence J. Warner, secretary.

J. H. Peters is a 1912 graduate of Case Institute of Technology. E. D. Peters is a 1939 graduate of Case Institute of Technology and was formerly employed by Colonial Iron Works in the engineering department. Clarence J. Warner, a 1934 graduate of Case Institute of Technology, had also been employed by Colonial Iron Works as engineer.

E. D. PETERS

C. J. WARNER

Dow Announces Expansion of Texas Division

Directors and officers of Dow Chemical Co., meeting at Freeport, Tex., last week, announced a $30,000,000 expansion program for the Texas Division. Shown are: Front row, Dr. A. P. Beutel, general manager, Texas division; Russell L. Curtis, general manager, Great Western division; E. W. Bennett, chairman of the board and vice president; and Alden B. Dow, director. Back row, C. J. Strosacker, vice president; Calvin A. Campbell, secretary and general counsel; Carl A. Gerstacker, treasurer; W. R. Veazey, director; Leland I. Doan, president; Mark E. Putnam, vice president and general manager; E. O. Barstow, vice president; N. D. Griswold, director; and J. S. Crider, director.

Decker Makes European Trip

E. L. Decker, president of Martin-Decker Corp., left Long Beach the early part of June for a 3-month business trip to Europe. His schedule calls for studying weight - indicator needs and conferring with oil men in London, The Hague, Germany, France, and Italy.

Maloney-Crawford Tank Establishes Fellowship

Maloney-Crawford Tank & Manufacturing Co. of Tulsa has established a graduate fellowship in the school of chemical engineering at University of Oklahoma, which will start in September 1950.

Purpose of the fellowship is to promote fundamental research which will be of interest to the petroleum industry. The fellowship is open to chemical engineering students who have already completed 1 year of graduate study.

Republic National to Build New Dallas Skyscraper

An architect's drawing of the New Republic National Bank of Dallas building announced by Fred F. Florence, president of Republic National. Covering an area of more than 1 acre, the building will be 440 ft. high. Its tower, extending about 160 ft. above the 36-floor main shaft, will give the structure an over-all height of 600 ft.

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7500′ of 2½″ Range 2 Upset Seamless Tubing. Call or write Edco Pipe & Supply Co., Box 565, Drumright, Oklahoma, Phone 933.

FOR SALE: New 1¼″ Improved plow steel wire lines 6 x 19 R L Hemp Core. One Spool 3500′ at 28c per ft. Four Spools 1800′ at 24c per ft. Thirty Spools 600′ at 20c per ft. FOB Okla. City, Okla. General Tool & Supply Co. P.O. Box 4387—1319 S.E. 29th. St., Okla. City, Okla.

FOR SALE—94′ Lee C. Moore Jackknife derrick. Folding type base 5′ 4″ high, 30′ long, 10′ cellar span and Portable Rig Model R-810-6 draw works, 36 x 8″ water cooled brakes, automatic and spinning line catheads powered by two 145 GKU Waukesha engines, butane and gas equipped. Price $17,500.00. Falco Drilling Co., Alice, Texas.

FOR SALE—10,000 new J-55—8 round thread couplings. Will sell any amount at $1.65 each loaded in railroad car. Stanford Engineering Company, Salem, Illinois. Phone 552.

PACKAGED H_2S REMOVAL UNITS

We offer prompt shipment on skid mounted hydrogen sulfide removal units for treating sour gas for pipe line or fuel gas purposes.

GRAFF ENGINEERING & EQ'PT. CO
3415 Westminster, Dallas 5, Texas

PIPE FOR SALE

5565′ 3½″ OD, 13.30# National Seamless Grade "D" A.P.I. internal upset drill pipe, range 2 lengths, with Reed super shrink grip full hole tool joints (4⅛″ OD x 2¼″ ID) attached. This is new material in railroad storage at New York, originally destined for export. Will sell at mill carload price with freight allowance.

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30 Rockefeller Plaza, New York 20, N. Y.

FOR SALE

1—Model UE-60 Allis-Chalmers Swabbing Unit Mounted on 6 x 6 x 2½ ton GMC G.I. Truck, with 6-cylinder GM Gasoline Engine and 7 x 6 x 50 Single Leg Telescoping Pole with 2-18 inch Roller Bearing Sheaves—Engine on Unit Completely Reconditioned.

1—Model 5000 Ideco Skid-Mounted Well Servicing Unit with 525 Buda Engine, Equipped with Electric Starting System and 7741 Brown Lipe Transmission—Engine Completely Reconditioned.

3—Model EKHU Waukesha Gas-Butane Engines.

1—Model VIK Waukesha Gas-Butane Engine.

Write or Call

Empire Machinery Company, Ltd.
Box 4025—Phone LD-18
Odessa, Texas

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

COOPER Single Drum Winch Tractor, Model W-201-26, with 45-foot mast, A-1 condition. $2250.00. Rogers Pipe & Supply Co., Tulsa, Phone 3-2072.

FOR SALE

BOILERS. Combustion Engineering, VU Type, 600#, 750° FTT 140,000# steam evaporation per hr. NEW, Never Erected. Immediate Delivery. 2—B&W, 450# psig. 700° FTT, 50,000# evaporation per hr. NEW. 2—B & W Bent Tube, 300#, 100,000# evap. per hr. NEW. All in storage. Inspections by appointment. Low Prices. Investigate. Drawings on request. CHARLES WEAVER, 4145 Penobscot Bldg., Detroit 26, Michigan. Send for Boiler Bulletin No. 320.

Several Army Surplus 4½″ x 6″ Gaso Duplex 1860 Pumps—two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

H. H. COFFIELD
ATTN: W. H. Orr
Phones: 132—Rockdale, Texas
A-86064—Houston, Texas

EQUIPMENT FOR SALE

CULVER Vertical Furnaces for exfoliating Perlite $10,000 compared to $100,000 for old style, also purest of Perlite for sale. Particulars Box 2153-OJ, Denver, Colo.

NATIONAL "50" Compound Double Drum Rig 126′ Cantilever L. C. Moore Mast. 10′ substructure. 6,000′ 4½″ drill pipe. This rig complete and in excellent condition. P. O. Box 205, Sta. B, Bakersfield, California.

WILSON Mogul Draw Works Unit with compound powered by International UD-18 Motor complete with 55-foot double telescoping mast ready to use. Two Traveling Blocks and Hooks, Rotary, 4-foot Substructure. All in good condition. Real Bargain at only $6000.00. Contact D. C. Bonnet Trucking Co., New Iberia, La.

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Marietta, Ohio
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2″ 4½# tubing, both regular and upset.

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1—	55,000-Bbl.	Riveted Steel	Tank
1—	38,000-Bbl.	Riveted Steel	Tank
2—	15,000-Bbl.	Riveted Steel	Tank
6—	10,000-Bbl.	Riveted Steel	Tank
4—	5,000-Bbl.	Riveted Steel	Tank
2—	4,500-Bbl.	Riveted Steel	Tank
9—	3,700-Bbl.	Riveted Steel	Tank
2—	3,100-Bbl.	Riveted Steel	Tank
2—	2,600-Bbl.	Riveted Steel	Tank
5—	1,900-Bbl.	Riveted Steel	Tank
3—	1,600-Bbl.	Riveted Steel	Tank
1—	1,500-Bbl.	Riveted Steel	Tank
4—	1,000-Bbl.	Riveted Steel	Tank
2—	350-Bbl.	Riveted Steel	Tank
1—	300-Bbl.	Riveted Steel	Tank
2—	746-Bbl.	Spheroid Steel	Tank

HORIZONTAL STORAGE TANKS

2—8-0 x 36-0 x ⅜″; 14,000 gallon; 101 P.S.I.W.P.; Riveted & Welded
3—8-0 x 20-0 x ⅜″; 7,500 gallon; Tanks
6—6-0 x 24-0 x ⅜″; 4,250 gallon; Tanks
2—7-6 x 28-0 x 7/16″; 9,250 gallon; Tanks
3—6-0 x 25-4 x 7/16″; 5,400 gallon; Tanks
3—7-0 x 32-6 x 7/16″; 9,350 gallon; Tanks
9—9-0 x 23-6 x ¼″; 12,000 gallon; Tanks
1—7-0 x 30-0 x 7/16″; 8,000 gallon; Tanks

1—Bubble Tower, flash tower for Cracker. Upper part Stainless Steel lined. 10-0 x 39-9 x 11/16″ thick x 1″ heads. 3 trays; 63 C.I. bubble caps/tray. 3 baffle plates 75 psi. @ 750 F.; riveted construction.
1—Fractionating Tower for Cracker. 10-0 x 52-6 x 11/16″ thick x 1″ heads. 16 trays; 63 C.I. bubble caps/trays; 75 psi. @ 750 F.; riveted construction.
1—Gasoline Weathering Tower; 3-6 x 50-0 x ½″ thick; 200 psi. test; 2-4 x 10-0 condenser on top; 4 trays with 16″ spacing.
1—Dephlegmator; 5-0 x 21-6 x 7/16″ thick; 100 psi. test; 5 trays, 20″ spacing.
1—Evaporator; 7-6 x 21-6 x 7/16″ thick; 100 psi. test; 4 trays, 20″ spacing.
1—Braun Vacuum Tower; 5-0 x 44-7 x ⅜″ thick; 11 trays; manway each tray.
1—Absorber; 5-0 x 30-0 x ⅜″ thick; 120 psi. test, w/Tulsa type mist extractor; 10 trays; 20″ spacing.
1—Absorber; 6-0 x 28-0 x ⅜″ thick; 30 psi. test; 16 trays, spacing 16″.
3—10-0 x 30-0 x ½″ thick; 18,000 gallon capacity. One double compartmented. Riveted construction.
1—Reactor for Cracker; 3-0 x 32-0 x 4″ thick; approximately 1″ concrete lining. Forged construction.
1—Reactor; 10-0 x 32-0 x 1¾″ thick x ⅞″ head. Welded construction.
2—9-0 x 33-0 x 1 1/16″; riveted construction.
1—9-2⅞″ x 39-1 x 1 7/16″ thick; 1—36″ manway and 1—16″ manway.

MANY OTHER ITEMS TOO NUMEROUS TO LIST. WRITE FOR BOOKLET, OR ARRANGE FOR PERSONAL INSPECTION.

EQUIPMENT FOR SALE

PORTABLE ROTARY RIG DRAW WORKS (Wilson) for Shallow Oilwell (about 2000') Drilling, with telescoping derrick mast, 4 legs, Roller Bearing Crown Block, all unitized with ROTARY TABLE on long skids, and tires — HIGHLY PORTABLE. Also: 7¼x10 mud pump with Heavy Duty Climax Engine. Will sell above items for $12,000 including BREWSTER oilbath Rotary Table. C. M. BARRINGTON, Phone 4915, Box 831, Coleman, Texas.

FOR SALE: Wilson Giant draw works, powered by two JL-1335 Buda engines with Wilson chain compound. Unit completely overhauled. Can sell separate or with a complete rig. For information, call or write Melton Supply Company, Box 1360, Seminole, Oklahoma.

1—Shot Hole Drill Truck, Chassis WHAX 1947 Dodge, Mayhew Drilling Unit—Model 600 Complete w/ Gardner-Denver 4½x5 mud pump. Mast 19 feet—Kelly 12½ feet. 100 feet 2⅜" Used Drill Rod. 3—Dodge Water Trucks: 2 Ton Chassis WHAX—2 Ton, 400 Gallon Tank, Tulsa 18—Winch. 1—Model DDH—Oliver Cletrac Tractor w/ Hercules 6 cylinder Diesel Engine, Electric Starter and battery ignition complete with southwest cable controlled trailbuilder and Buckeye Double Drum Power Control Unit. If interested, write or call The Atlantic Refining Company, c/o Mr. V. H. Gray, P. O. Box 2819, Dallas, Texas, Telephone P7-6484, Station 8-273, Dallas.

FOR SALE OR LEASE—Fully equipped 4500 Star Cable Drilling Rig. A real bargain. Write or see Dr. K. E. Little, 3829 Troost Avenue, Kansas City 3, Missouri.

JUMBO D Ft. Worth Spudder Caterpillar Diesel Engine one 44 inch one 36 inch bit big bailers stems, etc., big hole drilling. Sell tools or rig separate. Good running order. E. Frank Jones, Carlyle, Illinois.

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1—125 H.P. 350# Working Pressure "Oil Well Boiler," excellent condition. Completely reconditioned. Not used since last approved by State Boiler Inspector. Priced to sell. Make an offer.

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1" Standard—90,000 feet
1¼" Standard—15,500 feet
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4" Standard—22,000 feet
6" Standard—28,000 feet
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10" Standard—8,000 feet
12" Standard—6,000 feet

Random Lengths from 20-40 feet
Plain End
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All in excellent used condition

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EQUIPMENT FOR SALE

FOR SALE: One Gumbo Buster 26" Oil Bath rotary table in good running condition. Attractive price. Melton Supply Company, Box 1360, Semniole, Oklahoma.

FOR SALE: FAILING 3000' capacity rig, 55' mast, 5 x 10 G-D pump. Box D-587, The Oil and Gas Journal, Tulsa, Oklahoma.

USED Franks Model SA-4500 Rotary Rig with 96 ft. derrick, rotary table, and Cummins engines. Excellent condition. Write Box D-574, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: One 7¼ x 14 Whelan model 11000 Slush pump. New fluid end, gear box A-1. Melton Supply Company, Box 1360, Seminole, Oklahoma.

1 COMPLETE String of Rotary Drilling Tools: Ideal Draw Works, Wheland Clutch, 7¼ x 14 New Type Wheland Pump, Waukesha Motors, 3600' 4½" Drill Pipe, 122' Lee C. Moore Champion Rotary Derrick, Tool House and all necessary equipment goes with this rig. Anyone interested either write H. M. Williams Drilling Company, 701 Bitting Building, Wichita, Kansas, or telephone 48542.

41 ALLISON ENGINES
$395.00 Each

V-1710-49 and V-1710-53 12 cyl. Allison engines. 1000 HP. No time since overhaul. Less nose gear. Can be converted to natural gas.

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USED ROTARY AND CABLE TOOL DRILLING TOOLS, WIRE LINES. E. A. KELLY, BOX 861, OKLAHOMA CITY. PHONE 5-6407.

64' MAST, constructed of 8" Pipe with box type welded reinforcing, ROLLER BEARING CROWN BLOCK. Capacity 150,000# or more. Will sell for $900.00. Also, have a Boykin rotary table, good shape, for $600.00. C. N. ADKISSON, McCamey, Texas.

FOR SALE: 300 Amp Westinghouse welding machine powered by 6-BK Waukesha engine. Completely overhauled. Less than 50% of new price. Melton Supply Company, Box 1360, Seminole, Oklahoma.

FOR SALE: Cardwell RL spudder, complete with 5" tools, mast, light plant, steel tool house. Low down payment. Barnes Drilling Company, 22 West 4th, Tulsa, Oklahoma.

1—INTERNATIONAL PA-100 Gas-Gasoline Engine, Oilfield type. 1—L-Type Star Spudder with sheer poles. E. A. KELLY, BOX 861, OKLAHOMA CITY. Phone 5-6407.

INTERNAL UPSET DRILL PIPE AVAILABLE IMMEDIATELY

R-2 Pittsburgh seamless steel API, grade D 8 Rd. right hand threads
about 16,500 ft. 5½"—21.90 with thread protectors
about 4,000 ft. 2⅞"—10.40 with couplings.

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LOOK HERE FOR REAL BARGAINS
CONDENSERS AND EXCHANGERS

12—G-R, G fin sections, 1.9" O. D. tubes, 120 # w.p., 108 sq. ft. surface each.

1—Vogt, condenser, type Z-75-2-2 shell and tube, 896 sq. ft. surface, 290-¾"x16 BWG admiralty tubes, floating head, shell size 20"x16'.

1—Vogt exchanger, type Z-450-2-1, shell and tube, 102 sq. ft. surface, 90-¾"x14 BWG, seamless steel tubes, floating head, shell size 12-¾"x6'.

1—Vogt reboiler, type KU-100-2-1, shell and tube, 1625 sq. ft. surface, 524-¾" O. D. x 14 BWG seamless steel tubes, fixed head, shell size 47-¼"x16'.

2—Kellogg condensers, type 1-U-4, shell and tube, 1218 sq. ft. surface each, 158 1" O.D. x 12 BWG seamless steel tubes, floating head, shell size 27"x14'⅜".

1—Kellogg condenser, type 1-S-2, shell and tube, 2720 sq. ft. surface, 889-¾" O.D. x 16 BWG admiralty tubes, floating head, shell size 33" x 13'-¾".

1—Kellogg exchanger, type K-U-2, shell and tube, 1190 sq. ft. surface, 153-1" O. D. x 12 BWG seamless steel tubes, fixed head, shell size 72"x21' 4-½".

1—Kellogg reboiler, type K-U-2, shell and tube, 2590 sq. ft. surface, 455-¾" O.D. x14 BWG welded steel tubes, fixed head, shell size 74"x20'.

4—Kellogg condensers, type 1-S-2, shell and tube, 3745 sq. ft. surface each, 1224-¾" O.D. x 16 BWG admiralty tubes, floating head, shell size 39-⅛"x19'-1-⅜".

2—Kellogg reboilers, type K-U-2, shell and tube, 1850 sq. ft. surface each, 630-¾" x 14 BWG welded steel tubes, fixed head, shell size 84"x22'-1-¾".

1—Kellogg condenser, type 1-S-2, shell and tube, 3700 sq. ft. surface, 1027-¾" O.D. x16 BWG admiralty tubes, fixed head, shell size 35-⅛"x18'-7-¾".

1—Kellogg condenser, type 1-S-2, shell and tube, 838 sq. ft. surface, 357-¾" O.D. x 16 BWG admiralty tubes, fixed head, shell size 21-⅛"x10'-5-5⅛".

1—Kellogg condenser, type 1-S-6, shell and tube, 606 sq. ft. surface, 196-¾" x 16 BWG admiralty tubes, fixed head, shell size 14"x17'2".

4—G-R, twin G-fin sections, type LSS, 1-½" I.D. x .20" wall, 101 sq. ft. surface each.

1—Kellogg exchanger, type 1-4-2, shell and tube, 609 sq. ft. surface, 15-¾" O.D. x 14 BWG welded steel tubes, floating head, shell size 8-⅛"x12'-10".

1—Kellogg exchanger, type 1-S-2, shell and tube, 365 sq. ft. surface, 118-¾" O.D. x 14 BWG welded steel tubes, floating head, shell size 14"x17'-4-½".

1—Kellogg condenser, type 1-S-2, shell and tube, 277 sq. ft. surface, 188-¾" O.D. x 16 BWG admiralty tubes, floating head, shell size 18"x9'-9-¾".

1—Kellogg reboiler, type K-U-2, shell and tube, 359 sq. ft. surface, 59-¾" O.D. x 14 BWG welded steel tubes, fixed head, shell size 28"x20'-3-½".

1—Kellogg condenser, type 1-U-6, shell and tube, 2246 sq. ft. surface, 298-1" O.D. x 12 BWG seamless steel tube, fixed head, shell size 36"x16'-4'-3/16".

6—G-R sections, bare pipe, dual wall type, 6-1-½" I. D. x .20" wall x 23' seamless steel tubes, shell tube size 3"x23'.

DULIEN STEEL PRODUCTS, INC
of Washington
P. O. BOX 667
COTTON VALLEY, LA.
PHONE: COTTON VALLEY 26

Write—Wire—Phone for Complete Listings

XUM

EQUIPMENT FOR SALE

FOR SALE: One, type-100 National Drilling Rig has drilled only two wells. With 800,000 pounds capacity jack-knife derrick Box D-448, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE—CORE DRILL
Mayhew model 2000, mounted 4x6 G.M.C. Two 100 h.p. motors, 5x8 G.D. pump, 2000 ft. drill pipe. 4x4 Chevrolet water truck. Pole trailer, trailer mounted tool house and light plant. All necessary tools for complete job. First class condition, now working. Priced slightly over one-half of original cost. Call G. L. BUTLER, Phone 444-J, Riverton, Wyoming. P. O. Box 925.

WELL equipment. New and used spudders, rotaries, core drills, all sizes and types. Cable tools, drill pipe, bits, pipe. Fishing tools rented. Everything for well service. Pressey & Son, Pueblo, Colo.

FOR SALE
50,000 feet of 8⅝" OD, 17# used, plain end line pipe
30,000 feet of 16" OD x 5/16" wall, used plain end line pipe
Ohio points
ROGERS AND WRIGHT COMPANY
710 Peoples Building
Charleston, West Virginia
(Phone 30171)

FOR SALE
GAS, GATHERING OR FLOW LINES
50,000' 5⅜" and 5½" OD x .180/.200" Wall 9.5# Avg.
SEAMLESS ROLLER CUT BEVELED END TUBES
This material has been exceptionally well cleaned and for all practical purposes, can be considered good as new. Inspection or samples arranged for on request.
NEW LINE PIPE
90,000' 6⅝" OD x .250" Wall 17.02# New E.W. 40' Lgths.
40,000' 12¾" OD x .250" Wall 33.37# New E.W. 40' Lgths.
Available for Immediate Delivery, Subject to Prior Sale.
OTHER SIZES LINE PIPE AND TUBING AVAILABLE. FOR PRICES CONTACT
A. J. STRUBEL
4946 Murdoch, Sidney 1791, St. Louis, Mo.

EQUIPMENT FOR SALE

FOR SALE: One 7¼ x 14 FXK Gardner Denver power pump in first class condition. Late model pump with all new improvements. S. E. Frogge Equipment Company, Box 4455, Oklahoma City, Oklahoma, Phone 6-5518, Residence 2401 Moore.

WAR SURPLUS MACHINERY
Gaso, Byron Jackson, Aurora, Wayne, Lombard & Hale Fire Pumps with Engines, 1½ to 25 KW Generator Sets or Light Plants, Engines, Suction Hose, Fire Hose, Victaulic Couplings & Etc. Write for listing. H. A. McCarthy, 310 Thompson Bldg., Phone 5-3296, Tulsa, Oklahoma.

FOR SALE: E.L.I. M-7 small double drum portable rotary rig complete with 6"x6" Wheatley mud pump, suction & rotary hoses, kelly, swivel, 8" opening rotary table, drive bushing, drill collar, core barrel, hoisting plugs, subs, drilling lines & traveling blocks. All mounted on K-F-8 Ford truck with 10.00 x 20 tires. This rig has been operated only four months and is like new, will discount ⅓ from purchase price and allow some terms to reliable party. Phone 222 or address box 189, Madill, Oklahoma.

EQUIPMENT FOR SALE
2 New Hydraulic Shot Hole Drill Rigs at Special Price. Capacity, 400' of 3" hole with 2⅜" drill pipe comprising 1½ ton Ford truck, 25' 6" tubular mast with double acting hydraulic rams to provide 10' continuous non-chucking stroke, hydraulic operated winch, hydraulic powered rotary table, hydraulic rotary table push down, G-D 4 x 5 mud pump, swivel, 49 sections of 2⅜" drill pipe 10' long and complete accessory equipment.
Write or call:
C. R. ATHY, c/o International Derrick & Equipment Co., Atlantic Bldg., Dallas, telephone R-1031.

FOR SALE
2—6D-1742 Buda Diesel engines equipped with Twin Disc PTO, radiators & Belt Starting Bendix. FOB Odessa, Texas.
Call or Write:
EMPIRE MACHINERY CO., LTD.
Odessa, Texas
Phone LD 18 or Box 4026

HELP WANTED

CONTROLLER
Integrated Oklahoma oil company wishes to employ experienced, aggressive accountant under 45 years of age. Should possess initiative, ability to handle personnel, and experience in installation and operation of general accounting system and cost controls. Excellent future. Salary commensurate with qualifications. All replies confidential. Address Box D-550, The Oil and Gas Journal, Tulsa, Oklahoma.

ESTABLISHED Seismograph Company has opening for Party Chief. Two years minimum experience in charge of party and college degree in science or engineering required. This job offers adequate salary and profit sharing plan. Reply Box D-563, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Cable tool drillers and tool dressers on Bucyrus-Erie Spudder Machines, drilling water wells. Steady work. JOS. EGERER, Well Drilling Contractor, 1012 North Third Street, Milwaukee 3, Wisconsin.

FOREIGN and Domestic Oil Employment Directory covering the oil industry, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla.

STRUCTURAL designer C.E. graduate major in structural design with 3 to 5 years experience in design of steel and reinforced concrete structures, experience in structural design in oil refineries or chemical industry desired. (Address) Box D-583, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: SEISMOGRAPH PARTY CHIEFS—For field work in Alberta, Canada. Single or married men, no children, preferred. Minimum two years party chief experience required with university geological or geophysical background. Salary open based on experience and general ability. Excellent opportunity for men willing follow field work. Box D-531, The Oil and Gas Journal, Tulsa. Oklahoma.

SALES ENGINEERS
OPERATIONS SUPERVISORS
PERFORATOR OPERATORS
Only Experienced Men Need Apply.
WRITE ONLY
WELEX JET SERVICES, INC.
3909 Hemphill Street, Fort Worth 9, Tex.

Engineer Wanted

Large Company with expansion program has an immediate opening for a Petroleum Engineer experienced in production, drilling, and well completion operations in the Louisiana Gulf Coast area. Experienced with inland water operations is desirable. Rapid promotion is proposed as employee assumes responsibility. Salary will be commensurate with applicant's qualifications. All applications will be handled confidentially.

Write Box D-568
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

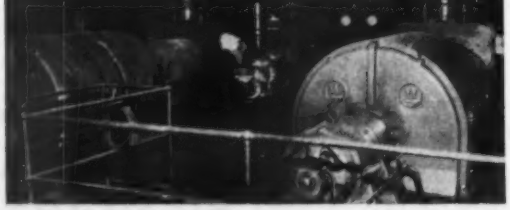
LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing, Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa, 3, Oklahoma.

WAREHOUSE SPACE

WAREHOUSE SPACE WANTED
Eastern manufacturer of oil well production equipment interested in warehouse in Southern Illinois.
Will consider establishing joint warehouse with associated but non-competitive company.
Box D-565, The Oil and Gas Journal, Tulsa, Oklahoma

We Specialize in
PROCESS STEAM PRODUCING TURBINE GENERATORS
OUR JULY SPECIAL: 2-MODERN HIGH GRADE MACHINES
BULLETIN 405 ILLUSTRATES DESCRIBES THEM
SEND FOR IT TODAY



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Correspondence Invited

CHARLES WEAVER

Wire or Telephone Our Expense 4146 Penobscot Bldg., Detroit, Mich.
Telephones: WO.1340, WO.1341, WO.1-6038

SITUATIONS WANTED

ACCOUNTANT-AUDITOR. Public accounting background. Now employed as assistant controller-office manager of independent refinery in Chicago area. Will relocate. Box D-578, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL WELL Equipment Manufacturers needing sales representative in Bradford, Titusville, Pa., and Bolivar, N. Y., Fields contact Bradford, Pa., man with intimate knowledge of producers and Supply Companies. Finest References. Reply Box D-582, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

FIFTEEN years experience in pipe-line operations, gaging, tank strapping, etc., and general movement crude oil. Can furnish references. Am 43, sober and single. Salary commensurate with regional pay. Available immediately. Reply Box D-575, The Oil and Gas Journal, Tulsa, Oklahoma.

SOBER, dependable production or drilling superintendent desires permanent connection with progressive independent operator. Available on short notice. Reply Box D-573, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE geological engineer-petroleum engineer, age 39. Experience: geophysics, reservoir engineering, sample analysis, electric well logging, valuation reports, geological reports, well completions. 15 years experience Rocky Mountain, Mid-Continent, and West Texas. Desires connection with responsible company. Reply Box D-569, The Oil and Gas Journal, Tulsa, Oklahoma.

PROGRESSIVE PLANT MANAGER for grease and lube oil plant. Fifteen years managerial experience—production control, product development, inventory control, purchasing, costing, personnel, traffic. Salary commensurate with position. Box D-[illegible], The Oil and Gas Journal, Tulsa, Oklahoma.

EMPLOYMENT as seismologist. Bachelor degree in geology, 9 years' experience in seismograph work with same company, 5 years foreign, 3 years as party chief. Available immediately. Reply Box D-566, The Oil and Gas Journal, Tulsa, Oklahoma.

LAWYER-ENGINEER: Ten years diversified experience, principally oil industry. Desires position requiring these qualifications. Box D-588, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE PETROLEUM ENGINEER-GEOLOGIST, 34, family, 9 years experience major company Kansas, Oklahoma, Texas, Illinois, and Michigan. Desires change to active independent. Capable supervising all phases development and production. Box D-589, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL Engineer: 15 years Crude Pipe Line Experience, machinery maintenance, Station Design for Gas Engine, Diesel and Electric Drive. Married, Age 38. Now employed as Plant Engineer. Desires Change. Box D-590, The Oil and Gas Journal, Tulsa, Oklahoma.

MAN with executive and sales experience, presently employed as General Sales Manager of an oil equipment manufacturing concern selling world wide, desires to make a new connection with a good, reliable organization. Prior to World War II, I was Executive Vice President and General Manager of a large corporation for twelve years, which showed an increase in business and profits each year, that was sold while in the service. I have been written up in Fortune Magazine and other national publications on my sales and promotional work. I am married, age 43, one child, sober and reliable. Box D-593, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT-OFFICE MANAGER: thirteen years experience in refining, production, drilling, transportation, marketing. Know taxes, insurance, finance and administrative. Age 34, married. Available immediately, any location. Replies confidential. J. C. Porter, 2520 Aloma, Wichita, Kansas.

SITUATIONS WANTED

EXPERIENCED LAND, Geological and Engineering Draftsman now employed major company desires change with chance for advancement. Box D-593, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS OPPORTUNITIES

WANT about $5,000 for small refinery deal in Montana. Abnormal returns from investment. Details — Box 2181, Denver, Colo.

FOR SALE: Well equipped Oil Field Machine Shop consisting of Hollow Spindle Lathe, 3 Engine Lathes, Boring Mill, Portable Welding Equipment, Bucking Machine, Gauges and everything for a complete Oil Field Machine Shop. This shop could not be replaced for $100,000.00. Doing $10,000.00 to $13,000.00 per month. Asking price $50,000.00. Box D-584, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Three "Self Service" Filling Stations of twelve pumps each, selling over 70,000 gallons gasoline per month. Two in Laredo, Texas (the only ones), one in Corpus Christi. Good locations on leased ground, approx 150 feet square, independent. Easy to operate, low overhead. Man with know-how and a transport can net $2000.00 per month. $46,000.00. Write owner, Joe Hall, 1602 Morgan Ave., Corpus Christi, Texas. Or will sell two in Laredo, $30,000.

FOR SALE—MAPS

NEVADA OIL AND GAS LEASE MAPS

Complete and up-to-date lease maps of the state. Filing service. Daily and weekly filing information. Geologic advice.

UNITED ENGINEERS

409 Cheney St., Reno, Nev.—Phone 4535

WANTED

WANTED: Settled sand production. Send details first letter. Reply P. O. Box 2161, Cincinnati 1, Ohio.

WANT OIL, GAS lease or interest in royalty: San Luis Obispo, Monterey Counties, California. Mail description data to Box D-592, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: SURPLUS Chemicals, Oils, Waxes, Solvents, Wastes and Residues of all kinds. Chemical Service Corporation, 96-06 Beaver St., New York 5, N. Y.

Business For Sale?

A nationally known and long established manufacturer in the capital goods field is interested in purchasing a small, going company that produces a capital goods type of product or products.

The product must have its major sales potential in the petroleum and chemical industries, be adaptable to present manufacturing facilities.

If for financial, management or marketing reasons, the owner or owners of such a company are contemplating its sale, please write

BOX D-540

THE OIL AND GAS JOURNAL

Tulsa, Oklahoma

All replies will be treated with the strictest confidence

MANUFACTURERS REPRESENTATIVE

WANTED: Representatives selling pumping equipment in South Texas, Louisiana, and Mississippi desiring additional items. State experience. Box D-580, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Manufacturers' representative for established line of oil well pumping equipment and specialties for the states of Colorado, Wyoming, Montana, and Western Canada. Give experience and list of present manufacturers represented. Write Box D-579, The Oil and Gas Journal, Tulsa, Oklahoma.

SMALL but aggressive company established for many years in California desires major line of oil field equipment to supplement single major line now represented. Will consider manufacturers' representative arrangement or dealership. Box D-567, The Oil and Gas Journal, Tulsa, Oklahoma.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorney, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

LEASE AND DRILLING BLOCKS

UP to 50 Acres royalty within 1 mile of new wildcat. Over $20.00 per acre for lease has been paid in vicinity. L. W. Wheaton, Box 236, Buffalo, Oklahoma.

OFFERING 30,000 acres leases Valencia County, N. Mex., 10,000 Hidalgo County, 6,000 Torrance County, $1.50 acre—17,000 acres Wallace County, Kansas, $1. Write if interested, Box 2153, Denver, Colo.

HAVE proven location for shallow oil. Need few investors with $100.00 to join in drilling. Quick action. Box D-535, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: Oil and Gas Leases and Drilling propositions in Shallow territory of Allen, Simpson, and Warren Counties, Kentucky, W. P. Harley, Bowling Green, Kentucky.

OFFERING 32000 10 yr. oil and gas fee leases at $1.25 per acre in Western Nebraska County where oil play is hot right now. Box 2181, Denver, Colo.

IF you've got real oil proposition or royalty that you wish to sell, or any defaulted municipal or special assessment bonds, bring your deal to me. Dyer-OJ, 1835 Champa, Denver, Colorado.

FOUR producing oil wells, seventy barrels production. Viola lime. Three separate leases. New equipment 4100' deep. Salt water disposal wells connected. HARPER WELL SERVICE, 1121 Union National Bank Bldg., Phone 4-2121, Wichita, Kansas.

MISSISSIPPI

North-Central GUSHERS. North-eastern shallow. Will block your favorite spot 5,000 to 10,000 acres. 25 wells drilling this year. Bank references and quick action. Leases your bank with draft attached. Blocking, buying, drilling Arkansas, Louisiana, Tennessee, Kentucky. Gilt-edge organization. OIL, 1369 Court, Memphis, Tenn.

LARGE block North Carolina ready for drilling contract. Write: Post Office Box 7043, Tulsa, Oklahoma.

LEASES ROYALTIES

Producing and Nonproducing

Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY

6376 Clayton Road, St. Louis 17, Mo.

ALBERTA LEASES

Put your name on our list to receive offerings of Oil and Gas Leases in the hot areas of Alberta.

Maps and Plats furnished.

ALBERTA LEASEHOLDS
Dept. 7
131 9th Ave. West, Calgary, Alberta.

PRODUCTION WANTED

WE ARE INTERESTED in purchasing marginal or semi-marginal production in Permian Basin for Cash or terms. Please send complete details to Box D-543, The Oil and Gas Journal, Tulsa, Oklahoma.

ROYALTIES

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

ELK CITY POOL—(Oklahoma)
Royalties at bargain. A. S. Berry, owner, 522 Wright Building, Tulsa, Oklahoma. Phone 5-5402. Investors with capital solicited.

MONTANA ROYALTIES
Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225, Great Falls, Montana.

LEASES AND RENTALS

FOR lease or rent 3030 square feet attractive office space in Frates Building, Odessa, Texas. Modern, air-conditioned and parking space. On lease basis, will arrange floor space to suit tenant. C. L. Frates, 1101 First National Building, Phone 2-6301, Oklahoma City, Oklahoma.

CALENDAR

July

Pacific Coast Gas Association, annual convention, Seattle, Wash., July 31-August 3.

August

Interstate Oil Compact Commission, summer meeting, French Lick, Ind., August 3-5.

September

National Chemical Exposition, Chicago Collseum, Chicago, September 5-9.

American Institute of Chemical Engineers, regional meeting, Minneapolis, September 10-13.

American Society of Mechanical Engineers, and Instrument Society of America, Municipal Auditorium, Buffalo, N. Y., September 11-15.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 13-15.

Instrument Society of America, annual instrument conference and exhibit, Municipal Auditorium, Buffalo, N. Y., September 19-22.

American Society of Mechanical Engineers, petroleum mechanical engineering conference, Roosevelt Hotel, New Orleans, September 24-28.

October

American Gas Association, annual convention, Atlantic City, N. J., October 2-6.

Mid-Continent Oil and Gas Association, Texas division, Dallas, October 4-5.

Petroleum Branch, American Institute of Mining and Metallurgical Engineers, Mid-Continent meeting, Roosevelt Hotel, New Orleans, October 4-6.

American Association of Oilwell Drilling Contractors, annual meeting, Mayo Hotel, Tulsa, October 9-10.

Petroleum Branch, American Institute of Mining and Metallurgical Engineers, West Coast meeting, Elks Club, Los Angeles, October 12-13.

Permian Basin Oil Show, Odessa, Tex., October 19-22.

Independent Natural Gas Association of America, annual meeting, Shamrock Hotel, Houston, October 23.

November

Mid-Continent Oil and Gas Association, Louisiana-Arkansas Division, annual meeting, Roosevelt Hotel, New Orleans, November 2-3.

American Petroleum Institute, annual meeting, Biltmore and Ambassador Hotels, Los Angeles, November 13-16.

American Society of Mechanical Engineers, Hotel Statler, New York, November 26-December 1.

December

American Institute of Chemical Engineers, annual meeting, Columbus, Ohio, December 3-8.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month. Ye Olde College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month. Jonathan Club.

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General American Announces Executive Realignment

Lester N. Selig, chairman of the board of General American Transportation Corp., Chicago, has been elected chairman of the board of General American-Evans Co. also.

Ben Colman, vice president of Evans Products Co., Plymouth, Mich., has been elected president of General American - Evans with general offices in Detroit.

V. R. Weiss, formerly of O. C. Duryea Corp., and a director of Hulson Co., has been elected executive vice president of General American-Evans with offices in Chicago.

General American-Evans Co. will operate the management of the new D-F cars, designed and built by General American and Evans Products jointly.

XUM

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The SWING Is To UNIBOLT Hinged Scraper Traps

Opening the UNIBOLT Hinged Scraper Trap requires two simple operations: Release two bolts; swing the hinged Blanking Plug open. Just as quickly, you can reverse the operation: Swing the Plug shut and tighten the two bolts. No heavy lifting. No danger of injuries through dropping a heavy closure. This compact UNIBOLT Hinged Scraper Trap takes the place of heavy, multi-bolt blind flange closures and leaky-thread bull plugs. And in addition to its economy, safety, and operating convenience UNIBOLT gives you a better closure, a tighter closure with longer life.

Any line or unit that requires closures, such as strainers, blowdowns, scrubbers, mist removers, and similar pressure vessels, may be UNIBOLT-equipped to real advantage. Wherever a blind flange is applicable, a UNIBOLT Coupling with Blanking Plug will do the job better—seal tighter, reduce weight, and save time.

UNIBOLT

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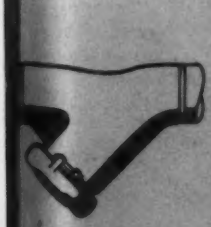
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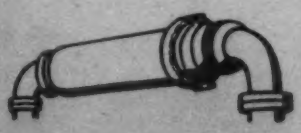
PRODUCTS LINE STRAINER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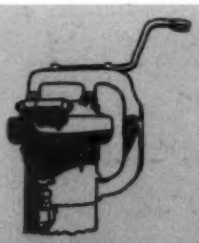
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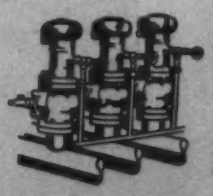

TERMINAL MANIFOLD

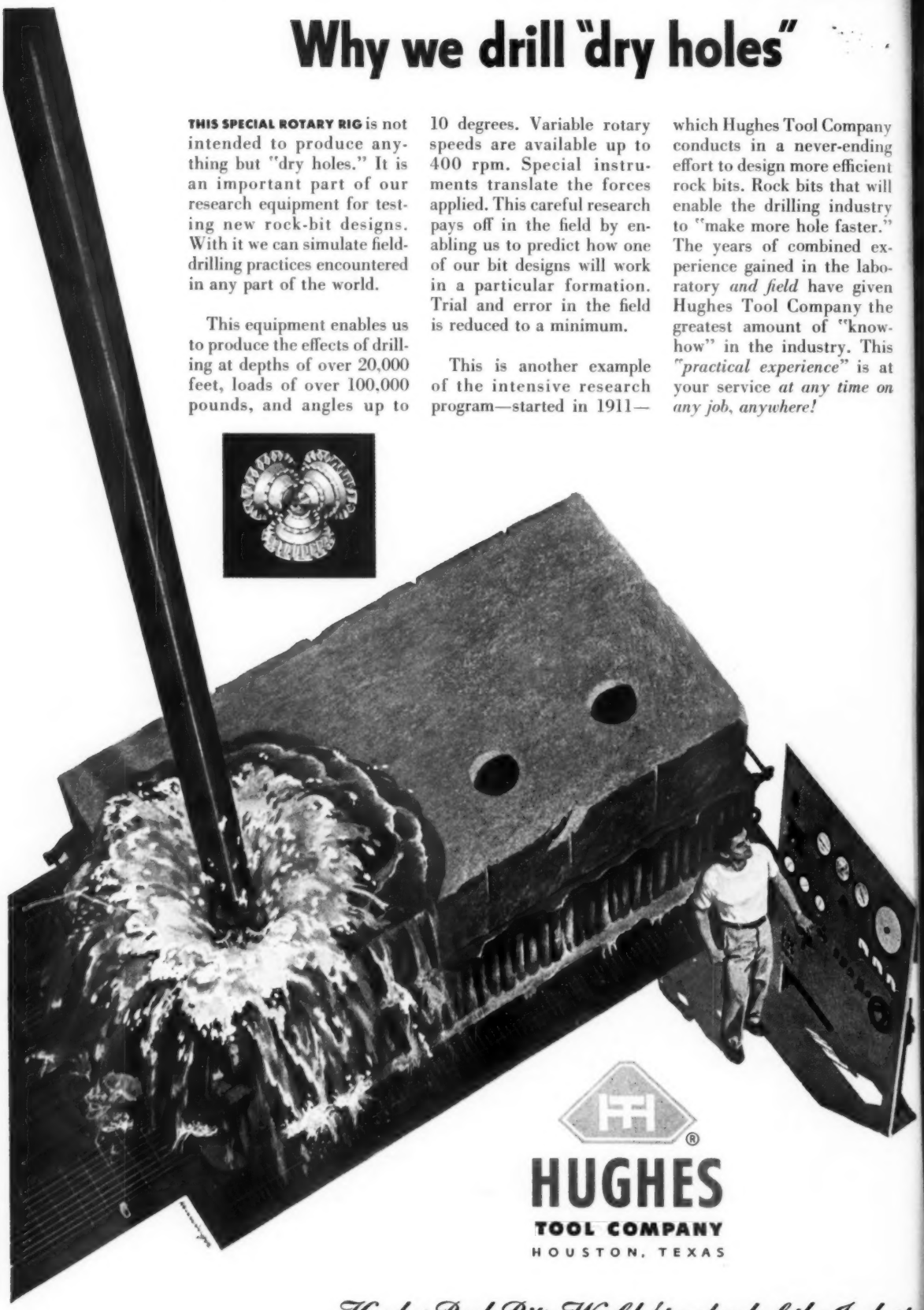
XUM

Why we drill "dry holes"

THIS SPECIAL ROTARY RIG is not intended to produce anything but "dry holes." It is an important part of our research equipment for testing new rock-bit designs. With it we can simulate field-drilling practices encountered in any part of the world.

This equipment enables us to produce the effects of drilling at depths of over 20,000 feet, loads of over 100,000 pounds, and angles up to 10 degrees. Variable rotary speeds are available up to 400 rpm. Special instruments translate the forces applied. This careful research pays off in the field by enabling us to predict how one of our bit designs will work in a particular formation. Trial and error in the field is reduced to a minimum.

This is another example of the intensive research program—started in 1911—which Hughes Tool Company conducts in a never-ending effort to design more efficient rock bits. Rock bits that will enable the drilling industry to "make more hole faster." The years of combined experience gained in the laboratory *and field* have given Hughes Tool Company the greatest amount of "know-how" in the industry. This *"practical experience"* is at your service *at any time on any job, anywhere!*



HUGHES
TOOL COMPANY
HOUSTON, TEXAS

Hughes Rock Bits—World Standard of the Industry